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THE
YOUNG NATURALIST :

AN ILLUSTRATED MAGAZINE

OF

NATURAL HISTORY

CONDUCTED BY

JOHN E. ROBSON, Hartlepool,

WITH THE ASSISTANCE IN VARIOUS DEPARTMENTS OF

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SEASONABLE QUESTIONS.

WE wish our readers once more the compliments of the season. May the coming year be the most successful of their lives, both entomologically and otherwise. May the dark cloud of depression, now grievously affecting the nation, speedily pass away, and the sun of prosperity return with the sun of summer. Some may think that these pages are not the place for a wish for a revival of business prosperity, but while a large number of naturalists may be more or less independent of trade fluctuations, there are, perhaps, a larger number who depend upon their work, or their success in business for their daily bread. When things are moving smoothly along, and each day brings what is required for the needs of the day, they can, with their minds at ease, give their leisure to their favourite pursuits. When a man is out of work and sees his little savings rapidly diminishing, or when a tradesman sees his stock lie untouched upon his shelves, and payments looming in the near future he does not see his way to meet, he cannot possibly give his mind to natural history with that zest and relish he would otherwise do. In all earnestness then we wish our readers success in the coming year, in all ways in which they desire it.

In commencing our sixth volume, we have a right to congratulate ourselves that we have achieved that success which our continued existence shows. During the five years that have elapsed since our first number saw the light, there has not been much new or startling in the entomological world. A few new species have been added to our fauna. A few life histories have been worked out. The discoveries in the northern islands have given us new food for thought, especially on the question of variation; while they have enriched our cabinets with interesting specimens. Death has taken away some well known names from our muster roll. Others have stepped from the ranks and now occupy leading places. But time passes on, insects emerge, lay their eggs and die, larvæ feed up and go through their

round of changes, in utter unconsciousness of the interest with which they are observed by us. Problems of great interest to us remain unsolved, or perhaps light begins to dawn slowly through the dim surroundings.

Christmas time, from an Entomological point of view, is but a dead season. We are re-arranging our cabinets, disposing of our duplicates, filling our blanks, or otherwise occupying ourselves until the collecting season comes round again. Yet there is collecting to do now if we would but do it, and problems to solve that winter collecting might help to elucidate. A casual remark on the effect of a mild winter on cold loving species, set us puzzling over a problem, to which we have called the attention of a large circle of correspondents, without the slightest result so far. We will ask the question here, in hope that a solution may be forthcoming, or at least that some light may be thrown on the subject. What we wish to know, is the effect as regards the appearance of the winter moths of a mild season? Does a mild winter hasten or retard their emergence? In a season like last, or like the present, up to the time at which we write, are we to expect *Hybernia rupicapraria* in December, or *leucophearia* in January? Are they influenced at all by the weather? Very few collect these winter moths. They are mostly of general distribution, and all common enough for the collector to obtain his series in his first year or two. After that, interest seems to subside, and their collection ceases. Thus notes and observations on these peculiar insects are seldom published, and we can find little or no data to go upon concerning them. It is generally understood that warm weather hastens development, and with certain limitations this is doubtless correct. But what is it that brings out the truly Winter moths, *Cheimatobia brumata* and *boreata* or *Hybernia rupicapraria*? Heat it certainly cannot be, does the absence of cold influence them? We have often noticed during severe frost, that these species disappear, to appear again the moment a thaw comes, before the snow has melted enough for them to emerge had they not been out already. Besides, after two or three weeks of frost, they may be found when the thaw comes, to be quite worn and wasted on the first night of their appearance, or we perhaps ought to say re-appearance. An interesting observation was recorded in our first volume of *rupicapraria* pairing during very severe frost, and others have been made as to the degree of cold they can bear, but all this, though interesting in itself, has little bearing on the question we are now raising, which is one that could only be solved by a continuance of observations, over a number of years. Do any of our readers think it worth their while to look out for the first appearance of these species and record their observations in our columns. We will gladly welcome any such notes. Will Mr. Carter of Bradford set the example? We know he

takes most of the species, and we are already indebted to his quickness in *knowing what to observe*, a most important matter in points like this.

It has always been a subject of wonder to us that these fragile-looking delicate creatures should brave the winter storms as they do. That larvæ, so small as to escape observation even from hungry birds, should survive the snows and floods; and, tiny little minims as they are, bear for weeks or months, entirely without food, exposure that would break down the constitution of the strongest man. But cold in its due season seems as necessary to their well-being as warmth and comfortable clothing is to ourselves. Snow, covering the surface of the ground, buries beneath it all low-feeding species, and effectually protects them from birds and other enemies. It has been said that certain species are more abundant after a few snowy winters, and it is quite likely to be the case. Insects in the perfect state are readily disturbed by seasonal change. The Brimstone butterfly has often been noticed on the wing in February, and we frequently have had the Tortoise Shell brought to us about the same time of year. If larvæ are aroused prematurely from their winter sleep, they will find no food ready for them, and must go back to their torpidity or die. Pupæ exist under different conditions, and no change is possible with them but one. With certain species, with most of species, we know that an increased temperature will hasten emergence, but no time is gained thereby. If the emergence of a June insect be hastened by increased temperature, and it appears in May, it only affords a longer time for the species to remain in pupa next winter. The eggs may be deposited earlier, and the larvæ feed up before its usual time, but the next brood is not brought to maturity any earlier. In some species the entire brood emerges every year, in others only part emerges the first year, some remaining to a second season, some to a third or even more. The Small Eggar (*Eriogaster lanestris*) is such a species, and specimens have been known to emerge every year for several years in succession, from pupa reared from a single brood. The advantage of this to an insect emerging in winter is very patent, and the entire race might be lost in some severe winter but for this fact. But it is not so well known whether this obtains with others of the winter moths, and the causes of so curious a circumstance are not known at all. We have so little data to go upon, as few observations have been made on this subject as on the other, and though they may have a very close connection with each other, we are quite unable to form an opinion on either. Will our readers kindly forward any notes they may have made on the subject, or give us the benefit of their suggestions. The author of the succeeding paper appears equally puzzled with ourselves, and equally unable to solve the question.

THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.,

Author of "Helps and Hints for Young Entomologists," &c., &c.

To tell the tale

How month by month through the revolving year

The insect tribes—Beetles and butterflies,

Moths, bees and dragon flies,

Grasshoppers, ants, and every varied form

Which sport in Summer's sun or brave the Winter's storm,

Come each in turn as moons and moons appear.

The above lines will serve the purpose of defining the scope of the series of papers herewith commenced. It is designed to give each month a brief account of the principal insects the young and inexperienced Entomologist should look out for, and also the localities in which they may most probably be met with. The papers will, in fact, serve as a guide to entomological work all the year round.

Persons whose mental vision is limited, regard all entomologists with more or less contempt, but they do so in ignorance of the important part the insect section of creation plays in the economy of nature. Insects are everywhere. Every plant has its tenants; every tree trunk—every dead wall even—its occupants. They fly in the air; crawl on the earth and burrow beneath its surface; swim in the waters, and climb the mountain height. Every clod and every stone shelters them. They are incessantly at work, fulfilling the purpose of their existence. Some, when ignorance of their habits permits them unduly to increase, are among man's worst foes, and work him more mischief than creatures a thousand times their bulk, and if not checked, might even imperil the very existence of the human race throughout large tracts of country. It is sufficient to merely mention the locust and the tsetse fly. Other examples will readily suggest themselves to the reader.

Not that all insects are man's enemies—some are his best friends. Several species are of use in keeping down destructive kinds; thus the various species of "Lady-birds" (*Coccinella bipunctata*, *C. 7-punctata*), do an immense deal of good by clearing off the aphides which infest our fruit trees, &c. Many species of caterpillars feed solely on noxious weeds, and probably exert no small influence in keeping them down. Moths, as well as other insects, have much to do with the fertilization of flowers, which otherwise would prove barren and produce no fruit. Some species too—needless to particularise—minister directly to our necessities or luxuries.

But the purpose of this series of papers is not to describe the advantage to

be derived from the study of Entomology, but to depict the varying aspects presented by the insect world month by months throughout the year. With these few words, then, by way of introduction, we will proceed to speak of Entomological Work to be done by the student of insect life in

JANUARY.

It seems strange, no doubt, to the uninitiated that it should be possible to do anything at all in Entomology in the Winter time. The popular idea is that, with perhaps the exception of a few gnats, the entire insect race is, for the time being, extinct, but the Entomologist knows that such is not the case, for even *Lepidoptera*—an order we more than any other associate with the warmer months—occur, and that even when the dreary Winter seems to have chilled the life out of all tender things.—

When trees are bare and sapless boughs
Moan in the icy gale as if they sung
A requiem o'er the tree whose life has gone
Down into earth from whence it sprung.

and when one could never expect to see any of the order to which butterflies and moths belong—

Yet by the hedge's side at twilight hour,
Moths flutter along heedless of the cold
And sport about as if frost had no power
To chill their tender life and to enfold
Them in death's grim embrace.

In what manner the moths of the genus *Hybernica* are organised so as to resist the effects of cold is a problem. Were their bodies clothed with thick down like the Drinker and Oak Eggar Moths it would be somewhat less marvellous, but it is not so: on the contrary they are very thinly covered. How then with their bodies thus constituted do they manage not only to survive the cold, but even to flit about the side of the leafless hedges in January, apparently as joyously as kindred species do in July?

I am unable to give a satisfactory answer to the question, although I have thought much on the subject. All I can say is that vital force is truly a wonderful thing, and the ways in which it manifests itself are numberless and as varied as creation itself. Although I should much like to enlarge further on the subject, I cannot do so now, but must leave it—at any rate for the present.

By way of shewing what the insect world is like in January, I will briefly describe an entomological excursion I made last winter, and I shall in all probability illustrate the other months of the year in a similar way, viz. by descriptions of other “days out.” I have had entomologising in various localities, chiefly in the eastern, southern, and midland counties of England.

The excursion just spoken of, and which I am about briefly to describe, was to that part of Cambridgeshire bordering on Suffolk, and was in fact

A DAY IN THE CAMBRIDGESHIRE WOODLANDS.

The popular idea of Cambridgeshire is, no doubt, that it is entirely a flat, marshy country. This is certainly true of a large part of it—that known as the fen district—but on the south and east we have a range of chalk hills of very moderate elevation truly, yet forming a district of quite a different character to the fen land. A part of this chalk district in which trees are not wanting is popularly known by Cambridgeshire people as the Woodlands, and it was to this part I drove over from Cambridge one day in the early part of last January. It was by no means a winter's day of the old fashioned sort. No dazzling white deluge of snow covered deep the verdant plain. On the contrary the meadows were as green as on a fine Spring day. The Red-breast was about and many of his kindred, but he did not shake

"From many a twig the pendant drops of ice
That tinkled on the withered leaves below"

as he flitted light from spray to spray, for the simple reason that there was none to shake. It will be in the remembrance of my readers what a mild Winter that of 1883-4 was, and the weather I experienced on this day's outing was a sample of it. I did not by any means confine myself to entomology. I am a naturalist of the "general" sort, and not only butterflies, moths, and coleoptera, but also birds, shells, rare plants, uncommon mosses or lichens and fossils—not to mention divers other Natural History objects—all have an attraction for me. I found or observed many other things besides insects worthy of recording, but I shall confine myself, with but one exception entirely to them, and this exception is the birds: I cannot forbear mention of them. No mistake they were plentiful—so plentiful that I feared it boded ill for my hopes of obtaining many coleoptera—and when I remember my ill luck on that day I feel greatly inclined to coincide with Mr. Mosley in the wish that they were not "protected" to such an extent as to make them a nuisance.

For alas! I *was* unlucky in my collecting, I am bound to confess it, and I can give a longer list of the lepidopterous pupæ and coleoptera I ought to have found than I can of the species I actually did find, and for this I blame our feathered friends aforesaid, and—although I am great lover of birds—yet as I pulled the moss off beech tree after beech tree in search of the pupæ of of *Eurymene dolobraria*, with the result that all my labour was thrown away, and as I vainly sought on the oak trees for both that species and *Odontopera bidentata*, and turned over stones and logs with the result of unearthing only

such Coleoptera as *Aleochara fuscipes* and like common species, I wished them further.

But I am getting on rather fast, and must not anticipate so much. I made Kirtling—a village about sixteen or seventeen miles from Cambridge—my halting place (or rather the halting place of my horse), and thence pursued my way on foot, searching all tree trunks, digging at their foot, and plying my trowel in every hedge-bank; turning over stones, logs, &c., but with an extremely disappointing result. The Coleoptera I found were such species as *Carabus violaceus*, the just mentioned *Aleochara fuscipes*, the shining black *Pterostichus madidus*, the black *Philonthus marginatus* with yellow-bordered thorax, and the moss-loving *Pselaphus Heisei*, together with several other species, but nothing of any value, and as for Lepidoptera, although I used my trowel unremittingly, the pupæ turned up were few and far between. Oak trees produced negative results so far as *Stauropus fagi*, *Notodonta trepida*, *N. chaonia*, *N. dodonæa*, *Nyssia hispidaria*, *Tæniocampa miniosa*, and *T. munda* were concerned. Beech trees yielded neither *Platypteryx unguicula*, nor *Demas coryli*, and the only species I did find were such as *Arctia lubricipeda*, *A. menthastri*, and *Tæniocampa instabilis* under the hedges, and the latter and *stabilis* at the foot of the oak trees; together with other common species, the names of which I did not consider worth recording.

I pocketed all the Oak-galls I could find, with the hope of breeding *Coccys splendidulana* and *Heusimene fimbriana* from them, and also bagged any teazle heads I saw for *Antithesia gentianana* and *Eupœcilia roseana*. I did not search for larvæ of *Halonota scutulana* in the thistle stems, as I think it better to collect them later, although the little pink coloured caterpillars may be found inside the stems of species of *carduus* from October to May, as also *H. fenella* from October to April, in roots and stems of mugwort (*Artemisia vulgaris*). I devoted part of my time to collecting lichens, so of course I looked out for the long and slender case of *Taleporia pseudo-bombycella* on *Lecanora subrosea*, *Lecidea parasema*, and other species growing on palings and old posts.

I could not find any of the larvæ of *Parasia lappella* in the seeds of burdock, although they may be found nearer Cambridge in the winter time. The larvæ of *Elachista rufocinerea* were common in the leaves of the creeping soft grass (*Holcus mollis*), and the mines of *Nepticula aurella* were abundant on the brambles, many of the serpentine galleries containing living larvæ, but I could not find any of the dark brown cases of *Coleophora albitarsella* on either ground ivy or marjoram leaves.

I returned to the hostelry where I had left the horse and trap, just as it

was getting dusk. *Hybernia rupicaprararia* was flitting about the hedges, but in less plenty than I saw it at Cambridge two days later, although even there it was in less abundance than I have seen it in some previous years. I think I have about recorded all my entomological doings on the day I have been speaking of. I saw no butterflies, but *Gonepteryx rhamni* was observed at Cambridge not many days later.

By way of appendix, I give below a list of the

LARVÆ OF TINEINA FEEDING IN JANUARY,

in addition to such as are mentioned above.

Tinea rusticella.—Whitish, with pale brown heads; on cloth.

T. pellionella, do., with red-brown head, and brown plate on second segment; on cloth, &c.

Adela Degeerella.—On Wood Anemone.

Gelechia affinella.—Pinkish in colour, with black head; on moss on old walls.

G. tricolorella.—Pale greenish yellow; in leaves and shoots of stitchwort (*Stellaria holostea*.)

G. bifractella.—White, with pale brown head; in seeds of Common Fleabane and *Conyza squarrosa*.

Parasia metynieriella.—Yellowish white with brown head; in seeds of *Centaurea nigra*.

P. carlinella.—Dull whitish, with black head; below the seeds of Carline thistles.

Dasycera sulphurella.—Greyish white, with reddish brown head; in decayed wood.

Ecophora pseudo-spretella.—Yellowish white, with reddish brown head; on dried peas.

Enchosis fenestrella.—Common in houses on waste substances.

Butalis grandipennella.—Dark olive green; in a web on furze.

Asychna aratella.—In galls on knot grass (*Polygonum aviculare*.)

Elachista gangabella.—In leaves of rough cock's-foot grass (*Dactylus glomerata*.)

THE OTTER.

(*Lutra vulgaris*.)

By W. H. WARNER.

Foremost among the river haunting creatures is the fish-destroying Otter. This is one of the few wild animals of any considerable size left in Britain,

but like the badger and the wild cat is doubtless undergoing the process of extirpation. Living at no great distance from the Thames, however, I often hear accounts of otters being seen, even in these days, more especially of late years. In Northern Britain it is still found in some numbers, and as it is both a marine and fresh-water animal it has a considerable choice of situation.

The home of the otter on our southern rivers is generally in a very retired spot, and is generally a burrow in the bank or among the twisted roots of the willow. Here it makes its residence, and as its movements are very stealthy it is but very seldom seen. When disturbed at a distance from its retreat, it glides easily into the water, and is soon making its way, eel-like, under the surface to some safer spot. When driven to bay it will sometimes take to trees. One was shot in a willow tree by a fisherman in our neighbourhood a few years ago. The otter in the water is a graceful, agile creature, its short, muscular webbed feet, and long powerful tail serving it in good stead in its pursuit of the finny tribe.

Fish are the otter's chief prey, and the damage it does in preserved waters is anything but trifling. Like the fox, polecat, weasel and other wild animals it is not content with catching sufficient for a meal, but seems to catch and kill apparently out of pure love for the sport. Thus it is a common occurrence for gamekeepers, fishermen and others who patrol the banks of large rivers, to find the remains of many fine fish, which have been merely tasted by the otter and then cast aside. The largest fish are sought by this tyrant of the flood, and many a tough battle must take place between the otter and its prey, worthy of being delineated by the pencil of the artist. I have been told of big eels and jacks, carp of eight or nine pounds, and monster barbel of twelve or more lying partly eaten on the banks of our stream, which could not have been dragged from their native element without a prodigious exertion of strength on the part of the otter. It does not attempt to devour its prey in the water but drags it to the bank, eats what it fancies, generally the daintiest pickings about the neck and shoulders, and then discards it. But slowly sailing along, with neck outstretched, and gently flapping wings, is another riverside denizen, the grey heron, who, less fastidious, sets to work to finish the carcase. Failing the heron, the rook will come from the field, the crow from the copse, and the rat from the banks, to pick the bones of the otter's prey.

Some anglers, while ready to give the otter an exceedingly bad character as a wholesale destroyer of fish, yet maintain that it never destroys the fly-fisher's special prize, the speckled trout. Early in the present month (November), however, a gentleman discovered on the banks of the stream, near Witney, the remains of a splendid trout of seven or eight pounds, which

had evidently received the attentions of this enemy of the finny race.

When fish are scarce, or the weather severe, the otter will descend to more ignoble fare—earthworms and larvæ having been found by Mr. Macgillivray in the stomach of a female otter. An otter was said to haunt the Windrush (a tributary of the Thames), in this neighbourhood, some time ago, and fish not being plentiful, it made great havoc among broods of young ducks, belonging to a farm-yard near the stream. At least the crime was laid to the otter's charge, though the mischief might have been caused by a blood-thirsty polecat, which animal is often found in the neighbourhood of water.

The otter is not only an exceedingly voracious, but also a fierce animal, and will often fight desperately. In August, 1884, the few dwellers in the neighbourhood of Newbridge on the Thames, were disturbed late one night by a great commotion in the water, and on lights being procured, and a search being made, two full-grown otters were discovered fighting and clinging to each other in the most blood-thirsty fashion. A man got into a boat and raised the combatants up out the water with a pole, but nothing daunted, the fight went on, the noise made by the struggling pair being, I am assured, very great. The affray lasted a considerable time, and was renewed farther up the stream. They were no doubt both dog-otters. When entangled in a net, too, the otter will make a great commotion.

In more northern countries, Scotland for instance, "otter-hunting" is a common diversion, and a rough and tumble sport it must be on the rushing, rocky streams of the Highland glens. It is also occasionally heard of farther south. When brought to bay, it is not easily secured, as its powers of biting, aided by its eel-like twistings and agility, gives it a great advantage. A thrust from a long spear generally terminates its existence, as the dogs cannot easily dispatch such a thick-skinned quarry.

In March or April, the female otter is said to bring forth from three to five young. In the summer of 1884, several young otters were heard of in our neighbourhood, one in particular having been caught by some conservancy men in the wharf at Newbridge, on the last day of May. It was about the size of a cat, the colour of a water-rat, and showed fight when taken. Two days later, another little one was caught near a mill on the Windrush, at no great distance away. Later on in the autumn, the occupier of a mill on the same stream was going through his water-meadows, with his gun and dog, when the latter pulled a half-grown otter out of a hole in the bank. The mother otter then made her appearance and seized the dog, and a sharp scuffle took place, in which the otter got decidedly the best of it. Mr. H. then shot the young otter, but had not another charge left for the old one.

The length of the otter is between three and four feet. It has a broad face

and muzzle, small eyes and ears, thick neck, long body and tail, and short muscular legs and feet, with membranes or webs between the toes. The colour is usually dark brown, but of a brownish-grey on the side of the head, and fore-part of the neck. The underside is also brown, but of a somewhat lighter shade than the upper-parts.

Standlake, Witney, Oxon.

A CATALOGUE OF BRITISH LEPIDOPTERA AND THEIR NAMED VARIETIES.

By JOHN E. ROBSON.

(Continued from page 284.)

MELANIPPE

Montanata

v. *Shetlandica*, Weir. The Shetland form, in which the band is more or less broken. It is not sufficiently distinct or constant to merit a name.

Galiata

Two forms are named by Haworth, *unilobata* and *quadriannulata*, but, I believe, they are not now recognized as varieties.

Fluctuata

Haworth names a form of this insect *castovata*, but like the last two it is not now recognized.

ANTICLEA

Sinuata

The name *cucullata*, Huffin., appears to have priority of about ten years over the name we use here, which should, therefore, give place to it.

Rubidata

A dingy form occurring in Russia is called *Fumata*, Ev. It has been found in Hungary, and might occur here as an aberration.

Badiata

This is placed in the genus *Scotosia*, by Dr. Staudinger.

Derivata

This is called *Nigro-fasciaria*, Goze, by Mr. South. The date of Goze's work is 1779-81, but it was called *Derivata* in the Vienna Catalogue, the date of which is 1776. If this be so, *Derivata* should stand.

Berberata

COVERNIA

Munitata

Propugnata

Mr. South calls this "*Designata*, Hufn., 1777; *Propugnata*, Fb., 1787." It was called *propugnata* in the Vienna Catalogue in 1776.

[It is quite apart from the purposes of this list to go into the details of the synonymy of the various species, and I will not trouble my readers with any more. I am aware that the names of the Vienna Catalogue are denied to have authority by some, for want of a sufficient description, but that is a subject open to a diversity of opinion, and, I think, that when their admitted priority has once been recognized, it is leading to unnecessary confusion to abandon them now, for no better reason than that one catalogue maker thinks the descriptions in another are not sufficient. Dr. Staudinger differentiates the varieties with the briefest possible descriptions.]

Ferrugata

v. *Spadicearia*, Bkh. This has the band formed of lines only. It scarcely deserves a distinctive name.

Unidentaria

Quadrifasciaria

CAMPTOGRAMMA

Bilineata

v. *Testaceolata*, Gr. Brownish (*testaceis*), not yellow.

Fluviata

The sexes of this species were formerly considered distinct, the female being named *Gemmata*, Hub.

PHIBALAPTERYX

Tersata

v. *Tersulata*, Std. Cat. (*Testacearia*, Dup. Cat.) Smaller, and more unicolourous, the lines being less distinct. (?) The second brood.

Lapidata

Lignata

Called *Vitatta*, Bk. 1794, which name should be adopted, *lignata* not having been given by Hubner till 1799.

Polygrammata

v. *Conjunctaria*, Ld. The central band less distinct or wanting. I do not know the Continental form of this species, but it seems doubtful if the type occurs with us.

Vitalbata

I have seen a very curious form of this insect, said to have been taken

in Cumberland. I could scarcely persuade myself it was the same species. I would be glad to see authentic specimens from various localities.

SCOTOSIA

Dubitata

v. *Cinerata*, Steph. Smaller, paler, and without the reddish tinge of the type.

Vetulata

Rhamnata

Certata

Undulata

CIDARIA

Psittacata (Schiff, 1776.) Called *siterata*, Hufn., 1769, in Staudinger.

Miata

Picata

Corylata

v. *albocrenata*, Curt. The band entirely wanting, and the forewings white with a few darker irregular markings. An aberration only, and not one that should have a distinctive name. It is not recognised by Dr. Staudinger.

Sagittata

Russata

This variable species has borne nearly a dozen names, but the forms run so much into each other that they scarcely deserve a distinctive name, although the extreme varieties appear very distinct. A common North of England form has the central part of the fore-wing filled in with orange-red. This is the v. *Comma-notata* of Haworth. A light coloured form, with the centre of the wing nearly all white, is the *Centum-notata* of Schultz. Another, with this portion smoky-brown, is the *Perfuscata* of Haworth. A very beautiful form, brown with distinct white lines, occurs in the Isle of Arran, but I have seen too few to know if it is at all constant. If it be so it is as deserving a distinctive name as any of the others.

Immanata

Equally variable with the last, and the varieties equally connected by transition forms. Several have been named.

v. *Thingvallata*, Sdr. Cat. Wings white, with base and central fascia black or fuscous.

v. *Marmorata*, Haw. Newman figures this variety (see fig. 2), and describes it, "The median area of the fore-wings is pale whitish

grey." Staudinger says "Forewings ashy, black, fuscous, white and ochreous, more minutely marbled, wavy in the middle." They do not agree very much.

- v. *unicolorata*, Str. Cat. Wings nearly unicolourous, white, grey, fuscous or black. It seems very absurd to give all these the same name.

These two species are so closely allied that it is no wonder they are mixed in so many collections.

Suffumata

- v. *Piceata*, Haw. The entire wing of the same colour as the central band. A very distinct form occurs at Deal, for specimens of which I am indebted to Mr. Sidney Webb. In it the band is darker and better defined than in the type. Mr. Webb tells me it occurs regularly, but sparingly, with the normal form. A similar form, as far as my memory serves me, is in Mr. Porritt's collection, taken by himself at Huddersfield.

Reticulata

Silaceata

Newman figures six distinct forms of this insect, the central band varying, from one with a broad uninterrupted fascia, to another in which it is separated into three distinct portions. This, I think, is Haworth's *Insulata*. But none of them are distinct or constant enough to merit distinguishing names.

Prunata

Testata

Populata

A form called *Musanaria*, Fr., occurs in Silesia and on the mountains of Bavaria. It may occur in Britain but I have never heard of it. It is darker and nearly unicolourous.

Fulvata

Pyraliata

Dotata

PELURGA

Comitata

EUBOLIA

Cervinata

Mensuraria

It would appear this species should be called *Limitata* Sc., that name being given in 1763 and *Mensuraria* not till 1776.

Palumbaria

Bipunctaria

v. Gachtaria Fr. This is an obscurely marked form, probably an aberration only. I do not know that it occurs in Britain, but it is given by South.

Lineolata

CARSLA

Imbutata

This is a variable insect and Staudinger gives our name to a variety, calling the type *Paludata*, Hub. I do not know if both are supposed to occur with us, but *Paludata* is pale and less distinctly marked than *imbutata*.

ANAITIS

Plagiata

A smaller and paler form occurs in Greece, &c. It is called *Pallidata*, Std.

LITHOSTEGE

Griseata

CHESIAS

Spartata

Obliquaria

This species was named *Rufata* by Fabricius in 1775, and not until the following year by that we use, which should yield to the earlier name.

ODEZIA

Chærophyllata.

NOTES ON VARIATION

IN SOME SHETLAND LEPIDOPTERA,

COLLECTED AT UNST, BY E. R. CURZON, Esq.,

DURING THE SUMMER OF 1884.

By C. S. GREGSON.

“*HEPIALUS HUMULI*.”—In size the specimens are rather smaller than Lancashire specimens, and many of them are exactly like ours in colour. Some of the males are darker on the thorax and decidedly blacker on the undersides,

and some male specimens vary very much from our white type. Sometimes the change is very slight indeed, merely two or three coloured marks or spots on the upper wings, indicating the change; some specimens appear with more marking occasionally, these markings are further developed upon other specimens, but in all cases seen by me, these markings are invariably placed in the exact position held by the marking upon female specimens, but are more spotty. I have heard it said they are "splashed about." In a few specimens, the marking takes the exact form and colour of the female, even when the white underwing is retained, but the variation goes further still; some male specimens have the dark underwings of the females intensified, that is, their underwings are darker than any female's underwings I ever saw, and still the variation goes on. Other specimens vary from the faintest creamy yellow tinge on the upper-wings, without coloured markings, to bright buffs, having distinctly red-ochre female-like markings, and some of these have very dark under-wings and under-sides. There are some specimens which cannot possibly be separated from the females by their colour and markings, and unless examined on the underside for the tufted hind-legs, might be pronounced females by the most acute entomologist. The red tufted hind legs settle the matter, as the female never has tufts on the last pair of thighs, but the male of this species always has.

In 1851 or 52 I was shewn a number of *H. humuli*, which were then called Shetland Ghosts, in London, but I did not buy any of them. They were males, and were more or less spotted on a white ground, and an old friend of mine got some of them which I have seen several times since in his beautiful and rich collection. These, and a single poorly marked recent specimen purchased from a London dealer by another friend, are all that I have seen from Shetland until now. Mr. Curzon wrote me from Shetland that the silvery males were commonest, and when I saw his captures I observed that "most of the specimens were not tawny." He placed his duplicate boxes at my service most liberally, and I picked therefrom *six different forms of humuli* males, and one ordinary coloured female. Two of the males are silvery on all the wings, and more or less marked with reddish ochre markings. One is silvery on the upperwings, but has dark underwings. The other three are buffs of various shades, with dark underwings, one of them is devoid of any red markings, these were the most interesting specimens in the box of duplicates. It seems to me that the captures of an amateur entomologist give us a more correct idea of the products of a district than those of a professional do. I give credit to the latter for great perseverance, but I cannot take his captures in this case as a guide to my opinion of the variation of the insects of a given district (as it would hardly pay him to bring ordinary specimens home) in

the face of box after box containing all that were or could be taken. May I ask what pattern or shade of *humuli* (no two specimens being alike) is var. *Hethlandica*? Are we not carrying our variety naming a *very little* too far when we name such mutable variations so indifferently.

Note.—Here in Lancashire we have several very interesting forms of *H. humuli*, I might almost say races. On the poor lands around our mosses the number of them are fabulous, except on Pilling Moss, near Garstang in North Lancashire; they seem to have few enemies, but on that moss there is a large family of Black-headed Gulls, which breed every year, and they hawk over the pasture lands every night in June, at dusk, in thousands, sweeping down upon every ghost moth that rises out of the herbage. The gulls fly in a cloud, about fifteen or twenty high over the land, and spare neither male or female ghost moth. In Mid and South Lancashire we have a peculiar form of the female, large and light buff, without any red marking whatever; whilst around Liverpool we have the females varying much in size, my smallest specimen being $1\frac{1}{4}$ ins. in expanse, whilst my largest specimen expands 3 ins., and is magnificently marked with bright red markings.

NOCTUA GLAREOSA.—Mr. Curzon brought a fine series of *Noctua glareosa*. The dark form (see pl. 1, fig. 1, *Entomologist*, Vol. 17), and this permanent variety occurred as six or seven dark to one light specimen. None with intermediate colouring were seen. I exhibited one of this form and colour at a meeting of the Entomological Society many years ago under the provisional name of *Noctua suffumosa*; it was taken in Yorkshire, and caused a lively discussion at the time; it is still in my cabinet, so that this is not an exclusively Shetland form. It is dark smoke colour.

AGROTIS TRITICI.—He also brought a grand series of this species. They are mostly bright coloured specimens, and taken as a whole, are lighter and handsomer than I ever saw before. They approach in character so closely to *Agrotis cursoria* that I think it just possible that a good critical entomologist might mistake them for that species. I examined them hoping to find some *cursoria* amongst them, but failed to do so. The upperwings of some of these glorious specimens are very like *cursoria* at the first sight, but a critical eye sees at a glance the want of the filling in of the lower part of the outer stigma, always present in *cursoria* here (sometimes present in *tritici*), but the shape of the species and the colour of the underwings, together with the want of irroration tell at once that they are *tritici*, just as the underwings determine *aqualina* from *tritici*, when they otherwise approach each other in colour and markings, as these two species often do. Since writing the above I have referred to pl. 1, fig. 2 and 3, *Entomologist*, vol. 17, and have no hesitation in saying that these figures are not representations of *Agrotis cursoria*.

They are veritable *tritici* and should be re-figured if the specimens they were figured from really are *cursoria*. See the shape and underwings of these two figures. The underwings of *Tritici* are rounder, suffused from the margin gradually towards the base, and the nerves always show more or less distinctly, the wing itself being cold grey. Whilst *cursoria* is a longer and narrower insect, its underwings are clearer and yellower, and always have a marginal border, more or less defined, like a *Heliothis*, but the margin is not quite so well developed as in that genus, and the upper portion of the wing is always clear, and free from observable nervures. I have been told that no stress should be laid upon the fact that these specimens are a little suffused, because Shetland insects are darker and smaller than English or Scotch specimens. Let us see how this works out in Mr. Curzon's captures. He showed me here the following species, and I looked over them several times each day for three days and made notes:—

Convolvuli.—Two, fine, large, light specimens. Light.

Exulis.—Twelve, large, several *very large*, light specimens. Much larger and lighter than the figures on Plate 1, Vol. 17, of the "Entomologist." *Scotch specimens are very dark* and much smaller than these. Light.

Adusta.—A long series, large and much lighter than Lancashire or Scotch specimens. Light.

Velleda.—A long series, all small as Manx specimens, and like them in colour, often very light. Light.

Festiva.—Small in size, but splendid dark specimens. Dark.

Note.—A very long series of exceedingly dark and small specimens of *festiva* were captured by Mr. Curzon, in Unst, at sugar, but there was not one light specimen amongst them, consequently he got no "var. *conflua*." *Conflua* being a *very light* form of *festiva*, which is common at Rannock, where it was first taken by Messrs. Dale and Curtis, above sixty years ago. Mr. Dale gave me his Type specimen about thirty years since, which specimen is still in my cabinet; if the specimens figured in the "Entomologist" are as dark as they are represented in my copy, then the mainland specimens have no claim to be called "var. *conflua*, Dale."

Xanthographa.—Not seen the specimens. Mr. Curzon thought they proved extraordinary varieties of *festiva* when examined carefully. *They are grand*.

Porpyhrea.—Little different from our moss species. I will say Dark for them though they are dubious. Dark.

Lucerneae.—*Grand*, large, very dark. Dark.

Occulta.—Exactly like Lancashire specimens, that is, rather light—*Scotch specimens are very dark*. Light.

Albutaria.—Some smoky, some very dark, all very small, *no two alike*,

which is, var. "Thules?" the very dark ones, the smoky ones, or the dusky form? Dark.

Montanaria.—All small, like Welsh specimens from Llanferres, but with richer reddish filling in. Dark.

Immanaria.—Only one poor specimen.

Eudorea angustalis.—Very light, like Welsh specimens from Rhyll Llandudno. Light.

Dalella.—Like English specimens. The *Tinea* he brought do not vary, *cladiella* being the best species taken.

Munitaria.—Very fine, varies a little from the Scotch form, some specimens being smoky looking. Dark.

Didymaria.—Dark males, very light, large females. Half.

Fluctuaria.—Large, dark. Dark.

Cesiaria.—Many very dark, many banded forms, and many light specimens were brought; varies little from Lancashire, Yorkshire, and Welsh forms! Herein consists the value of an independant amateur entomologist's collection over that of a Dealer's collector, who might only bring the variable forms, and so we might jump to the conclusion on seeing his collecting boxes that all the specimens he saw were varieties.

C. musculana.—A long series, exceedingly variable, but all bright silvery light-grounded specimens. Light.

No specimens of *cursoria*, *hyperborea* or *conspersa* were taken, but the larvæ of *conspersa* and *venosata* were sent to me from Unst by Parcel Post, feeding on the seeds of *Silene maritima*, and are now in pupa. When they appear I may write my observations thereon. In the meantime I think we may sum up that out of eighteen or twenty species captured during the short Shetland summer by Mr. Curzon, when compared with English and Scotch specimens nine or ten are lighter, or as light as ours, and eight or nine are darker. Whilst one or two species are doubtful either way, *venosata* is like the Manx specimens in colour, but less in expanse. Whilst *Eupethecia Curzonii* is like nothing else I know, except, perhaps, a young naturalist might mistake it for *Phibalapyterx lineolata* in marking and shape, but it is a more delicate and silvery-looking insect. Its greatest peculiarity is that hardly two specimens are alike, and very often its two wings differ in markings, it varies from light silvery lineolate to dark banded specimens, often with a broad well pronounced central band, cut up with two faint silvery lines, which follow the shape of the striga they are in.

THE LAW OF PRIORITY.

The publication of the Entomologist Catalogue of Lepidoptera has awakened considerable interest in matters pertaining to nomenclature, and most of correspondents object to the idea of re-arranging their collections, according to a list that may be superseded by another issued under greater authority. Our own opinion on the subject is unchanged. We want a list issued by the Entomological Society, or better still, if our Entomological Society would invite the leading Societies abroad to join them in a list, the names of which should remain in use, notwithstanding the fact, that some one may subsequently unearth, in an obscure work, some name or other that had priority over that adopted. Such a list would assimilate the names used here with those used elsewhere, would be accepted by every one, and would stand unchanged for generations. Several of our young readers have asked the meaning of the term "law of priority," as applied to nomenclature. It seems to carry its meaning in its face, but we may say that the law is, that the earliest name, accompanied by a satisfactory description or figure, must be adopted. No matter what inconvenience or worse, naturalists may be put to by the constant changing of names, the law is made to ride over all questions of expediency and advantage. As at present carried out, the "law of priority" is uncertain in its operation, and exceedingly inconvenient in practise. Our readers may wonder when we say that a clearly defined law can be uncertain in its operation. It depends, however, so much on what is considered a satisfactory description of a species, that it really becomes a matter of individual opinion as to which name should stand. One catalogue maker sets aside the work of one author, another accepts it, and the differences we find between one list and another is often a difference of opinion as to whether a certain author's descriptions are sufficient. There is even some doubt as to where the starting point should be. Shall the 10th or 12th edition of the *Systema Naturæ* be taken? Many of the alterations in nomenclature made by Staudinger and adopted in South's list, are only made because Dr. Staudinger thought the descriptions in the Vienna Catalogue (W.V.) are not sufficiently explicit. Yet Staudinger himself differentiates the varieties he names, with the briefest possible description, and gives us figures, and a subsequent writer might quote his own words against himself.

We think also that it is the height of absurdity to set aside the name and description of a well known author, whose works are in every good library, because some obscure writer has been discovered, who in some local catalogue, or other book of small importance, had described the same species and named it differently at an earlier date. To give an illustration, we may refer again

to *Colias edusa*, which well known name, the law of priority demands, shall be set aside for the earlier name, of an author whose work is so little known, that Dr. Staudinger does not seem to have met with it.

This brings us to the further point of the disadvantage of the present law. It actually, under pretence of making things clear and certain, throws difficulty and doubt on every name. In our review of the *Entomologist* Catalogue we pointed out several difficulties that would arise, but our difficulties are nothing to those of the future investigator. Since the publication of the last edition of Doubleday's Catalogue, many of the names have been changed in dealer's lists, and in the writing of magazine correspondents. *Blandina* has been called *Medea*; *Agestis*, *Medon*; *Alexis*, *Icarus*; and so on. Many of these names, and numberless others, are proposed again to be altered, and the future writer on the British fauna will be given endless trouble, and probably he will be led into blunders that would have been avoided under a better system of nomenclature.

Leaving the names of species, let us consider for a moment the names of of Genera. Does the law of priority apply here too? If so, where do we begin? The object of dividing and sub-dividing a group is merely for the convenience of students, that we may be able to locate a species in such place that it is surrounded by those most nearly allied to it. A thoroughly good definition of a genus is a great advantage, and the more restricted the genus if well defined, the better it is. Now this is merely a matter for the student, and we ought to have some reliance on those who have given most attention to the subject. The breaking up into genera should never be left to the catalogue maker. As additional knowledge is gained, and former generic definitions become obsolete or insufficient, students of different groups will propose to divide genera, or to take an insect from one genus and give it to another. It is the student then, and never the catalogue maker, who should be allowed to alter our generic arrangements and names. Dr. Staudinger, in one or two cases, mixes up a most heterogeneous mass of species under one genus, *Agrotis* and *Cidaria* for instance. Here, surely, the law of priority has nothing to do with it, or if it has why do we end there? If the original diagnosis of the genus was sufficiently wide to admit all these various species, is that sufficient reason for retaining it undivided now? If it be, why do we not go further back and call them all PHALÆNA, a name that was used, within the memory of some living entomologists, for all the moths, and one that certainly has "priority." The mere suggestion of such a course shows the absurdity of the law of "priority."

Independent of the numberless actual blunders, the *Entomologist* list contains so much that is more than doubtful in its nomenclature and arrange-

ment, that there is not the slightest possibility of its adoption. It is neither satisfactory in itself, nor does it bring us into harmony with the names of Continental collectors. We do not altogether like the Doubleday arrangement, but it is at all events one that can be understood. We prefer the incorporation of the Pseudo Bombyces with the Bombyces, and the Noctuae to follow, which group, terminating with the Pyrales, is succeeded by the Geometers. But until some satisfactory and authoritative list is issued we shall continue to use that of Doubleday. In the meantime, for the convenience of our readers and the public generally, we propose to print a list of British species, after the Doubleday arrangement, with all additions and corrections to date. It will be issued first in our Supplements, and afterwards separately, on one side of the paper only for labels, and on both sides for reference and exchange purposes. We will also give names for all well defined varieties, and in the label list they will be printed so that they can be cut off and used separately. We hope to give the first portion of the list next month, and invite *early* suggestions on the subject.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The Annual Pocket-box Exhibition of this Society was held on Thursday, November 13th, 1884, and, as regards the number of members and visitors present, was very successful. Amongst the gentlemen may be mentioned: Messrs. Elisha, Machin, J. A. Clark, J. A. Cooper, W. Harper, J. Harper, H. Harper, Russell, Sheldon, Conquest, T. Eedle, Henderson, Southey, Gee, Boden, Burry, Phipos, Franklin, Bryant, Meek, Gates, Bartlett, E. Cooper, Downing, Schooling, Cripps, Lewcock, C. H. Williams, Drs. Sequeira and Pool.

The exhibits, however, were hardly so numerous as on former occasions, though many interesting boxes were on the table. Prominent among these was Mr. Meek's very fine lot of *H. humuli*, from Unst, consisting of the peculiar forms which are now well known to entomologists. In the same box were also observed several specimens of *M. montanata* var. *Shetlandica*, *E. albulata* var. *Thules*, black vars. of *N. glareosa* and *L. caesiata*, together with *M. furva*, dark vars. of *N. conflua*, and some very extraordinary and beautiful forms of *A. cursoria*. Mr. Meek also contributed specimens of the new *E. Curzonii* and *C. exulis*—all from the above locality.

Mr. J. A. Cooper showed a magnificent lot of *M. artemis*, reared on honey-suckle; and also specimens of *C. phleas*, which he had succeeded in rear-

ing from the ova, the specimens were full-sized and very brilliant. In the same were observed five *E. versicolor*, one *P. nubeculosa*, from Rannock; two specimens of *A. cardamines* having yellow markings in place of orange; a variety of *L. corydon* with clear underside, and many other interesting species.

Mr. J. A. Clark exhibited a small box containing a suffused form of *C. elinguaris*, of a peculiar appliance, the insect looking more like *Fasciaria*; also two *M. rubiginata* var. *plumbcolata*; one var. of *C. fulvata*; four vars. of *C. corylata*; four specimens of *P. lapidata*; six *D. irregularis*, and four magnificent *M. artemis*.

Mr. W. Harper had a nice series of *A. prunana*, and also a second brood of same, the difference in size being very marked; also specimens of *P. falcula*, *P. lacertula*, *P. unguicula*, *P. hamula*.

Mr. Southey showed a fine series each of *H. sylvanus*, *N. rubi*, *T. rubricosa*, *X. scolopacina*, and vars. of *A. grossulariata*.

Mr. Gee exhibited his magnificent unique specimen of *A. grossulariata*, having the wings suffused with orange.

Mr. Bartlett: *P. betulella*, *P. ornatella*, *P. subornatella*, and *C. dumetellus*.

Mr. Hockett: series each of *C. dominula*, *B. rhomboidaria* var. *perfumaria*, and a variety of *L. corydon* with clear underside.

Mr. Gates: varieties of *A. caja*, all much suffused, and one entirely smoke-coloured, with the exception of the body; these were a second brood, and Mr. Gates has obtained a third brood, the young of which he exhibited.

Mr. May: Case of Life Histories.

Mr. Machin: *G. smaragdaria*.

Dr. Pool: Specimen of *Nerii* captured at Tottenham.

Mr. Boden: Red form of *T. gracilis*.

Mr. Williams: *A. leporina*, *A. alni*, *A. ligustri*, and larvæ of *M. stellatarum* and *E. angularia*.

Mr. Hawes: Specimen of *Exigua*, two vars. of *S. tilæ* and others.

Mr. Pratt: Specimen of *Prionus corriarius*, captured at Chingford.

Towards the end of the evening the awards were made in the various competitions. The President in presenting the prizes expressed his regret that the members had not taken more interest in them. The prize for the best lot of varieties was taken by Mr. W. Harper, who sent in a confluent var. of *C. villica*; a specimen of *S. tilæ*, lacking the marking on one side and of a peculiar colour; and a specimen of *A. menthastri*, having the black markings radiated along the wing rays.

NOTES AND OBSERVATIONS.

NOTES FROM NORTH DEVON IN SEPTEMBER.—The season chosen for a week's collecting on the North coast of Devon was far too late for any good results to follow. A few days rain, followed by a cold N.E. wind, which veered more easterly during my short stay, absolutely prevented anything being done. At Morthoe, on Sept. 13th, a few *cardui*, *atalanta*, *urtice*; one *P. agon*, were the only Diurni noticed, and excepting a few of the commonest species, such as *gamma*, no moths were visible anywhere on the coast. On September 12th, we went by steamer to Lundy Island, the celebrated rock standing out in the entrance of the Bristol Channel. Owing to the prevalence of the east wind, the small landing-place, which is sheltered from every other other quarter, was quite inaccessible, and the rough sea dashing in huge breakers on this generally cosy little nook. We had to be content with looking from a distance on the enormous blocks of granite, the weird-shaped crags and masses of stone, over which sea birds flew in countless multitudes. A beetle (*C. hæmoptero*) alighted on board. The sea-fowl were principally Gannets, Puffins (or Sea-parrots as they call them in the Island), Guillemots, Razor-bills, and several Gulls. At the lighthouse on the Island a large number of eggs are kept, from this stock we hoped to replenish our collection, but hoped in vain. Porpoises were pretty numerous, and a large hawk flew by our vessel. Several early morning trips, sea-fishing with hand lines, produced Rock Whiting and Sea Bream, but in comparatively small numbers, as the coast near Ilfracombe is in fisherman's parlance "a cold bottom." Earlier in the year the Salmon Bass are numerous off this coast, and very good sport they afford when hooked on a light line.—JOHN HENDERSON, Herne Hill.

N. GLAREOSA IN WORCESTERSHIRE.—I took two specimens of *N. glareosa* at sugar in August. This is a species Mrs. Hutchinson tells us she has never taken here, but she collects in Herefordshire, and we took ours in Worcestershire, on our usual trees close to the house. That was the only night we had any moths at the sugar, though we tried several times when it was both warm and dark.—RUTH PRESCOTT DECIE, Bockleton Court, Tenbury, 9th November, 1884.

EXCHANGE.

DUPLICATES—*Ocellatus*, *Tiliæ*, *Rhamni*, *Galathea*, *Cardui*, *Selene*, *Paphia*, *Cardamines*, *Cervinaria*, *Comitata*, *Vetulata*, *Ilhunaria*, *Apiformis*, *Pudibunda*, *Flavocincta*, *Persicaria*, *Marginata*. DESIDERATA—*Sinapis*, *Cratægi*, *Hyale*, *Cinxia*, *Athalia*, *C-album*, *Semele*, *Rubi*, *Betulæ*, *Alsus*, *Argiolus*, *Comma*; Numerous Moths. Also, a pair of Long-tailed Tits.—J. BATES, 10, Orchard Terrace, Wellingborough.

Dispar (Males and Eggs), *Haworthii*, *Rufina*; *Desiderata* very numerous.—F. ELLIS, 32, Swallow Street, Huddersfield.

DUPLICATES—**Dispar* and ova, **Augur*, *Conspersa*, *Parthenias*, *Juniperata*, *Rubiginata*, and *Fulvata*, Pupa of *Triliniaria* and *Jacobæa*.—C. H. WILLIAMS, 7, Gower Place, Euston Square, London.

I have nearly the complete family of Longicornes, and many of the Chrysomela and Geodephega. DESIDERATA.—Marine Shells, British and Foreign. Lists sent.—G. PULLEN, Free Library, Derby.

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THE BLINDWORM

(*Anguis Fragilis*,)

By W. H. WARNER.

SUNNY, flower strewn hedge-banks, old ivy-covered walls, hazel coppices, the borders of woods, and the like, are the favourite haunts of the exquisitely beautiful Blindworm, and here it may be seen in the sunny days of early spring, coiled up in its peculiar knot, like a "piece of tarnished coloured wire," to quote the words of a well-known observer. Beautiful the Blindworm most certainly is, though it requires a somewhat close acquaintance to become aware of the fact. Its bright, coppery coloured, snake-like body, will on examination be found to be exquisitely polished and perfect, the small and numerous scales being closely set, in neat and regular rows. The eyes of this reptile too, are lively and brilliant, and it is a sad mistake to call it blind.

Last year I paid more than ordinary attention to the habits of the Blindworm, and knew where to find one at any time. Common it certainly is if you only know where to look for it. My plan was to raise the large, flat stones lying on the turf, near a certain little wood in Berkshire, and I was seldom disappointed. Life under these stones was generally well represented. In addition to a Blindworm or two snugly curled up, there were nearly always flourishing nests of the different kinds of ants underneath, as well as woodlice, beetles, and similar creatures. Shell-snails too, were often to be found under the stone. The Blindworm is also often found occupying the low-built and deserted nests of the hedge-loving birds, and on more than one occasion has been found coiled up snugly enough in the nest of the Moss Bee (*Bombus muscorum*), the Humble Bee, with the orange-coloured thorax, which is so often seen in early spring, busily employed about the rich, honey-yielding blossoms of the white dead nettle. Two Blindworms were found comfortably resting in a tenanted nest of this bee near the comb. How the bees could permit such an intrusion is rather curious. I once uncovered a Moss Bee's nest myself and regretted it, for I had to scamper over the ground rather

quickly to get the buzzing out of my ears. Perhaps the stings of the bees were powerless against the mail coats of the uninvited guests. I have heard of a Fieldmouse living in the same hole of a hedgebank, with a colony of wasps, which is more remarkable still.

The Blindworm occurs commonly in all parts of England, from the Isle of Wight to the Yorkshire Moors. [I have found the Blindworm at Black Hall Rocks, midway between Hartlepool and Castle Eden Dene, in the County of Durham.—J.E.R.] In Wales and Scotland it is also found, but not in Ireland. No snaky-looking reptiles dare trespass on the soil of the Emerald Isle.

The Blindworm is one of the first reptiles seen abroad by the naturalist and country rambler in his early spring walks. The sunny days of March bring it forth from its retreat, and it may then be seen basking in the sun on dry banks, and similar places. Like the common Lizard it has a very great liking for warmth, and I have found it in sunny and frequented wood-paths, lying fast asleep, totally unsuspecting of danger. It is usually seen gliding about the herbage in coppices and hedgerows, or else curled up in its peculiar knot in some warm spot. On a footstep approaching it, it will glide off quickly enough if it be among grass or herbage, but if on a smooth path it will proceed but slowly. I met one in a woodland path, where it could scarcely move half a dozen inches till put among the flowers and ferns, when it soon made its escape. The provincial name of "Slowworm" given to this reptile, though appropriate in some cases, is as a rule very wrongly applied, as local names often are. As the Blindworm glides about its haunts, it is on the lookout for food, which seems to consist entirely of the little grey and white slugs, with perhaps a few insects occasionally. In confinement it has also been known to eat Earthworms. Eating with the Blindworm is a gradual operation.

This reptile, like its distant relation, the common Lizard (*Vide Young Naturalist*, Vol. 5, p. 247), is remarkable for the fragility of its tail. When seized or struck suddenly, it oftentimes snaps itself in two, that is, the tail part separates from the body, the latter generally making its escape, and the tail part jumping, twisting, and wriggling about for a long time. When, however, the reptile is handled gently and cautiously no such results happen according to my experience. Another tail grows again in course of time, but it never equals the original in appearance, being short, thick and stumpy.

Like other reptiles, the Blindworm changes its skin, but it does not devour it afterwards. Searching for Blindworms one day last August under flat stones, I found, instead of the Blindworm, the remains of its "slough," which it had left behind. This consisted of a few ring-shaped fragments, each series of

tiny scales being pressed back, till what was perhaps a fourth of the body, was thus compressed into a very small compass indeed.

The Blindworm in common with most reptiles, possesses a very unenviable reputation, to which, as is usually the case, it has no claim whatever. Some country people say that it will destroy cattle by biting, and all accuse it of being "deadly poisonous." How this can be, seeing that the reptile has no poison fangs, and only a very small mouth, the labourer does not stop to inquire; he has been told by his father before him that the Blindworm is poisonous, and that is sufficient for him. Though it has a small mouth, it has plenty of teeth, which, however, are so minute, that the creature, if willing, could only inflict a very trifling injury. The Blindworm has other enemies beside the country folks, being often devoured by the beautiful Kestrel and other hawks.

Early in May, 1871, walking through a hazel coppice, and engaged in the pursuit of the lovely Azure Blue Butterfly (*L. argiolus*), I was attracted by a continual rustling among the dead and dried leaves a few feet from the path, and going up to see the cause of the commotion, I found two Blindworms engaged in a lively encounter, which might possibly have been courting, but which certainly looked something more serious, inasmuch as one of the reptiles had the neck of the other in its mouth, and was shaking it most viciously, to which of course an objection was raised, and the two were twisting, twirling, and thrashing the ground and herbage in the most curious fashion. They did not desist on my approach, both being evidently in earnest, and continued struggling and shaking each other with great pertinacity. Having made several attempts to separate them with my stick I at length succeeded, and then they made little attempt to escape, stowing themselves away under the dead leaves. I was solemnly assured by a respectable-looking man who came up at the time that these "Slowworms" were most "deadly poisonous."

The Blindworm, like the Common Lizard is ovo-viparous. The young are from six to twelve in number, and are brought forth from May to August, and sometimes as late as the first week in October. The Rev. J. G. Wood describes some young Blindworms he had as being "very pretty, yellow above, black below, and might easily be mistaken for young vipers, especially as they have wide heads, a black streak along the spine, and a black V on the top of the head." Some young Blindworms I found early in the month of May, last year, were slender in form, and of a creamy-yellow colour, with a brown stripe along the side. Another one found in June was grey-brown on the back and sides, and whitish on the belly, with what appeared to be a bluish mark or stripe running through the middle of the latter. The Blind-

worm is often kept in captivity, is easily tamed, and will live a long time in a fern case, if fed on small slugs or worms, and kept supplied with water. A correspondent to *Science Gossip*, speaks of one which had been in his possession twenty-eight years.

In former times the Blindworm was classed among the snakes, and certainly it has a very snake-like appearance. It is, however, a lizard with invisible legs, though the latter may be found in a rudimentary form beneath the skin. It has also moveable eyelids and a small gape like the Lizard. The following is a description of the Blindworm. Its length varies from ten to twelve or fifteen inches, and I have heard of monsters which reached eighteen and nineteen inches. The upper surface is usually of a steely brown, with a dark line down the back, and some along the sides. Underneath it is black, with a whitish network. There are several varieties of this reptile. One mentioned in *Science Gossip*, Vol. 8, p. 117—a blue-spotted one—is a very remarkable variety. Another one found in the New Forest, and known as the “Red Adder,” and popularly supposed to be more poisonous than the viper itself, is of a bright reddish-purple. Another found in Yorkshire a few years ago was a brilliant copper colour. Others have occurred of different shades of brown, from rich sienna to a dull leaden hue. There is, however, not the slightest fear of the Blindworm being mistaken for any other British reptile—its slightly square form, and obtusely-ending tail, rendering it easily distinguishable from the snake-tribe, which it most nearly resembles. Another good distinction is the joining between the body and tail, which is easily to be seen.

Standlake, Witney, Oxon.

THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

FEBRUARY.

It is on one of those mild days that we often have in February, especially towards the end of the month, that we start on an afternoon's ramble. The walk which I ask my readers to accompany me with in imagination is just such an one as I have often taken. The afternoon is bright and genial as a spring day, and when we reach the country we see the corn fields verdant with the young green blades of wheat and barley, and making a pleasant picture lighted up as they are by the bright beams of the sun. Overhead we hear the lark's melodious song as he soars heavenwards, mounting higher and higher into the blue sky, until he becomes such a tiny speck we can scarcely

see him, and then suddenly, as if the excitement has been too much for him, falling headlong down, apparently exhausted by his exertions,

Let us look on the trunk of yonder oak tree, possibly we may find a *pilosaria* resting thereon. Yes, here is one so fresh looking that it is apparently but recently out of the chrysalis. We see that it is rather greenish looking, pale-grey in colour with four faint transverse lines. This is the male moth, the female is entirely wingless.

There is another moth (*Nyssia hispidaria*) to be found now, although as it is far from common, very probably we shall not be fortunate enough to meet with one to day. It is pale grey in colour, of a smaller size than *Phigalia pilosaria*, and like that moth possessing a downy thorax, but the abdomen is stouter. The female has such short wings they are hardly perceptible.

Here is a chocolate coloured moth clinging to a hawthorn twig. It has a thick body, and a whitish transverse line runs across each fore wing, and there are two conspicuous white spots also, one of which is in the centre and the other at the base of each of the front wings. We recognise it at once as the Small Eggar (*Eriogaster lanestris*), and most probably we shall find some more if we look about. It will be as well also to search the lichen-covered palings for the long and slender case of *Talæporia pseudo-bombycella*. The larva is whitish with a black head.

We do not see any fir trees near us or we might perhaps beat from them the reddish-grey larva of the Barred Red Moth (*Ellopiæ fasciaria*). If there were a spruce fir at hand it would be as well to look in the fir cones for the pale yellow larva of the rare *Asthenia strobilella*.

Suppose we turn over some of these stones and brickbats we see lying about in the grass, and search for coleoptera. See we have unearthed a large beetle—one of the Carabidæ—of a brown colour. You know the common *Carabus violaceus*, of course, but this is of a somewhat different shape; broader and less slender, although about the same size. It is *Carabus monilis*, and you will find it beautifully figured in the first plate of the fourth volume of this magazine, together with several others of its kindred, a glance at that plate will enable you to recognise it better than any description. Although not a rare species it is less common than *Carabus violaceus*, but I believe it is generally distributed.

Have any of my readers ever kept these ground beetles alive? I have myself frequently, and, although it may seem strange to some, I have succeeded in taming them—to some extent at least. They are long-lived insects, comparatively speaking, so that their owner has time to get them accustomed to him, and when tamed they will come readily to be fed with a tiny piece of

scraped meat. Like many other beetles too, they are also fond of drinking sugared water.

Now let us have another try. This large flat stone, lying in a ditch by the side of a hawthorn hedge, seems a likely object to shelter a good assortment of Coleoptera. Let us raise it. Yes, just as we thought, out runs a shining black-beetle (*Pterostichus madidus*), and we see several specimens of *Aleochara fuscipes*, so startled with the sudden light we have let into their abode, that they apparently do not know which way to run; and there again runs a sooty, black, great rove beetle (*Ocypus olens*), with his tail curled over his back and his powerful jaws menacingly open. There is another species very much like him in shape and size, but having grey elytra instead of black (*Creophilus maxillosus*).

Here is a poplar tree, with lichen covered trunk. Let us search it round for the pale green larva of *Cleora lichenaria*. Here is one, not feeding indeed at the present moment on the lichens, but ensconced in one of the numerous crevices in the bark. We may also find it on elm and other trees. It may be readily identified by the two small protuberances on each of the last eight segments.

Now let us turn down this green lane. It is somewhat muddy at this time of the year, but no naturalist cares for a trifle of that sort if he thinks he can get specimens. Here is a young woolly bear caterpillar (*Chelonia caja*), which the mild weather has tempted out from the snug retreat in which he has been hibernating. Here we find some stitchwort (*Stellaria holostea*) growing, and we see some of the leaves are mined by a pale-greenish yellow larva of diminutive size, it produces a small moth called *Gelechia bicolorella*. There is another species, white in colour, with a pale brown head, producing a tiny brown moth, with orange coloured fascia on its fore-wings, and an orange coloured head (*Gelechia bifractella*). It feeds on the seeds of the common Fleabane, and also on *Conyza squarosa*. It is perhaps best to defer collecting them until they have pupated later on, unless you like to dig the whole plant up and grow it in a pot at home.

There does not happen to be an old moss-covered wall hereabout or we might find another species of *Gelechia* (*G. affinella*) feeding thereon, I described it last month and there is no need to repeat the description.

We shall probably find several species of Coleoptera in this lane. I have not space to enumerate the names of likely kinds. Such common species as *Carabus violaceus*, and the sorts already mentioned are sure to be found, and for the others I must refer you to the excellent articles on the Order which have appeared in former numbers of this magazine.

Look ! that man trenching that field is hailing us. "Hi, Master !" we can hear him shout. We go over to him, and as we approach he asks us "Do ye want to buy any grubs ?" The "grubs" which he displays in his extended palm are the larvæ of *Agrotis segetum* and *exclamationis*. We stop a few minutes to see whether he turns up any more, and before long he disinters a fat *pronuba* caterpillar and a *Mamestra brassicæ* chrysalis. We point to yonder burdock and ask him if he would mind digging it up for us. He does so and as we anticipated there are two or three of the whitish ochreous larvæ of *Hepialus humuli*, with reddish-brown heads. He tells us he has dug up "lots of them things," and if we wait a few minutes he will soon turn up some more. We do so and he resumes his trenching, and speedily turns up a whitish caterpillar of the same shape as the *humuli* larva, but smaller, and with a yellowish-brown head. This we at once recognise as the caterpillar of the common Swift moth (*Hepialus lupulinus*.) Boxing the caterpillars, we give the man the price of a pint of beer and resume our walk.

Here are some old thistle stems—we will split them open and see if they happen to have the rare larvæ of *Myelois cribrum* feeding inside them. If by good fortune we find any we shall see that they are greyish in colour, striped with bluish green and with black heads. But, however, luck is against us. There are several of these internal feeding larvæ to be found now. *Halonota scutulana* is another species living inside thistle stems, and we may find *H. fenellana* in the stems and roots of mugwort, and *Dicroramphia petiverellana* in roots of yarrow; but it is perhaps advisable to defer collecting till later on.

But now we leave the road, and going a short distance down a high road strike across a common. Here is a stray teasle head, it will be as well to see whether it contains the green larva of *Eupæcilia roseana*. We shall no doubt find several other coleoptera about here. We prolong our walk until the sun has got low in the heavens, when we think it about time to turn our face homewards. As the dusk of evening comes on we see *Hybernia rupicaprararia* flying about the hawthorn hedges, while in the neighbourhood of the oak tree whereon we found *Phigalia pilosaria* we see *Hybernia leucophearia* and *H. progemmaria*.

The above account is a fair sample of the work which an entomologist may do in February. In addition to the species I have mentioned, the lepidopterist may, if he visits heathy places, meet with *Cheimatophila mixtana*. The forewings of this tortrix are silvery grey, streaked with chocolate brown, and the edge of the costa is reddish.

Cambridge.

PEREGRINE FALCON'S NEST IN SUSSEX.

By R. J. ATTYE.

ABOUT the middle of April, 1883, I was staying in the West of Sussex. Knowing that Peregrine Falcons breed along the coast, between Beachy Head and Newhaven, I determined to try and find a nest. I went by train to Brighton, and from thence to Newhaven with two friends. Wishing to go over the cliffs I enquired for some fishermen, and was fortunate enough to find three who were in the habit of dangling.

We set out about the middle of the day, one of the fishermen walking along the shore to observe and signal to us. The two fishermen brought with them a bar and a rope for a guy rope, while my friends and I took turns in carrying the Alpine rope, which we always use on such occasions. After walking some distance we came to a small colony of Herring Gulls, not far from which the sailors had on the preceding year taken some young Falcons. I went down two or three times and got a few Herring Gull's eggs. A little way further on we saw a Peregrine fly out of the cliffs, about a hundred feet below us, and the fisherman below shouted up to us. The ropes were fixed and I again descended. The cliff overhung somewhat, but about eighty or ninety feet down I came to a ledge. There were no signs of a nest, but a few yards to the right lay a Herring Gull's egg on the bare chalk. Crawling to the egg I saw a small recess scarcely a yard beyond it. This was a little semicircular hollow in the face of the cliff, with a slight depression at the base. In it were four Peregrine's eggs laid on the bare chalk. My conscience smote me for a moment as I took the eggs, but I remembered if I were to leave them, the fishermen would most assuredly take the young Falcons. There are, I believe, at least three Peregrine's nests every year along this piece of coast.

The four eggs I obtained were of the usual red type, but I subsequently saw some in Brighton, which had been taken a year or two before in the vicinity of Newhaven, the ground colour of which was much whiter, and the markings more blotchy and streaky, as in a Sparrow Hawk's egg.

Several pairs of Ravens build along this coast, and four or five together may sometimes be seen on the edge of a cliff between Beachy Head and Bell Tout lighthouse.

The great danger of descending these chalk cliffs, is from the rotten nature of the edge of the cliff, and the loose flints, for which a good look out must be kept, and a helmet worn.

Stratford-on-Avon.

ENTOMOLOGICAL NOMENCLATURE.

By C. S. GREGSON.

The appearance of what has been called the "Entomologist List," appears to have opened up the old question of Entomological Nomenclature again, and there seems little chance of it doing anything towards settling the matter, judging from what I have seen and heard of it. Some time ago I published a pamphlet on this subject, which went out of print in a few weeks; but which pamphlet was most unfavourably reviewed recently in the *Entomologist*. Some people think unfairly reviewed, but be that as it may, it has evidently done its work, which was to warn Young Naturalists against letting the mere bookmakers override them and their work. The appearance of the "Entomologist List," so soon after explains why it got such a queer review in the *Entomologist*. No one having read that pamphlet would be likely to let the *Entomologist* force its very imperfect List upon them. With Doubleday's universal terminals to certain sections in his Catalogue—*ata*, *alis*, *ana*, *ella*, and *dactylus*, we know at once what we are speaking of by his terminology; but in this new list all that has been done for us recently is done away with, and a mere catalogue maker throws our recognised genera away, as he copies other people's books—errors and all—without giving us any of his own knowledge of insects. We are told, nay ordered, to change our knowledge, and our names, and arrangements in our collections, not because we wish it, but because somebody wants to make money out of it! Not because science will be advanced by so doing, but because somebody has got a crotchet about a *fancied* law of priority, and a notion that they can set Linneus and other naturalists right in scientific nomenclature. Can folly go further than the following illustration. We all know the following species as *Janira*, *Janthina*, and *Janthinana*, &c. Now the compiler of this list tell us we must, from now and for ever, call them *ianira*, *ianthina*, and *ianthinana*, to please a mere catalogue maker, not a recognised scientific entomologist; Linneus spelled *Janira*, &c., as did Ochsenheimer, Haworth, Stephens, Westwood and Humphreys, Stainton, &c., in fact everybody everywhere. Boisduval and Guenée, in France; Duponchel, H. Schæffer, Hubner, &c., in Germany and Austria. It only remained for some young men at Oxford and Cambridge to form themselves into two clubs and call themselves the "Entomological Societies of Oxford and Cambridge," in or about 1858 (I knew some of them personally), and then copying "Rennie," correct all who had gone before them. And for a late dealer in insects to follow these University youths'

"Accentuated List," Rennie's Compilation, and Staudinger's catalogue, copying from them and doing away with the useful terminology of Doubleday's synonymic list, and destroying the French arrangement thereof and introducing the German, seek to force this new and imperfect list upon us by telling us that henceforth we must conform to it in all our communications to the *Entomologist*. I suppose we can do without communicating to the *Entomologist* just as well as it can do without our communications! I shall certainly not communicate matter by this list. Let me show one or two of its imperfections. If Mr. South has done anything it is amongst the Plume moths; let us see what he knows about them. See *Entomologist*, Vol. xv., p. 103, and Vol. xvii., pp. 259, 260.

Leioptilus Wal. (a very recent author), *Microdactylus*, Linn., is well-known to lay its eggs on its food-plant (*Eupatoria cannabinum*), in June. The young larvæ are hatched in a short time, and soon enter the terminal shoots, feed and pupate in the stems, drooping the terminal shoots; thus being at least eleven months within the stems. It may be bred in June next by anybody who will go and collect a bagful of dead terminal shoots of that plant, during winter or spring. He here introduces a recent generic name, whilst advocating the law of priority in specific names. Can inconsistency go further? The generic name of *microdactylus* has been *Pterophorus* above a hundred years. It is evident from these references (Ent. p. 103, Vol. xv., and p. 259-60, Vol. xvii.), that he is not giving us his own knowledge, either specifically or generically. In his list he gives *Oxyptilus teucris*, Greening (Ent. List), another recent genus. Where does his law of priority come in here? This species was discovered by me, feeding, in Wales, the same season Mr. Greening took it in Delemere Forest, and I figured and described it in the transactions of the Northern Entomological Society. The description was printed and published, and I sent a copy of it to Mr. Jordan late in May, before his description was published in June following. I named it *Britainadactylus*, and explained why I called it so, viz. because though it was a N.S. I had taken its imago in England, Scotland, Ireland, and Isle of Man, repeatedly; up to then it was always called *Hieraci*, Sta., I had, however, differentiated it before its larvæ was found, having obtained the true *Hieraci* from Zeller himself, again preferring *dactylus* as a uniform terminal.

There only seems to be one little bit of originality in this list, and that is a change of place; not an improvement—the alteration of adding an "i" in many of the family divisions, for Macaridæ he says "Macariidæ," for Gelechiidæ he says "Gelechiidæ," for Acontidæ he says "Acontiidæ," &c. All are copied from the "accentuated list," or from Rennie's conspectus.

Next he rubs out all Doubleday's work in adding the diminutive termina alis, ana, ella, or dactylus, to the root of the name, and gives us Staudinger's catalogue names for the species, doing away with much of the generic work of our own and other authors. Otherwise, excepting in his one original idea of changing the locality of the plumes, he is all and everywhere a copyist, even to the family names, errors and all. Why then should we adopt it? Does it not appear plain that this so-called law of priority, should have prevented Mr. South from adopting Wallingren's recent division of the old genus *Pterophorus* into *Amblyptilia*, *Mimæseoptilus*, *Edematophorus* Wal., or *Oxyptilus*, and *Acipitilia* of Zeller. Surely if this so-called law is good for specific names, then it is good for generic and family names. We are told in a review of the list by Mr. Dunning that the location of the plume moths is the striking feature of Mr. South's Classification, now divided, as they are into nine genera, all nearly of which are recent genera!! Where then is your law of priority? That they should be so divided is patent to any one who knows the larvæ, and their different appearances and habits, but I must confess I see no affinity between *Acentropos* and *Agdistis*, the one is aquatic, and the other terrestrial, and though *Chrysocoris* may, as Mr. Dunning says, have manifest relationships to the plume moths, and Curtis may have said "this moth is closely allied to the *Pterophori*," meaning, I presume, *festaliella*, Hub. I fail to see the necessity of removing nine or ten genera to them or anywhere else, when they, if allied, might have been brought to the mountain, be that as it may, to which of the *Pterophoridae* are they allied? All the plumes were by priority *Pterophorus* Linn. Do not think I object to Wallingren's and Zeller's, or Hubners, or any other person's division of the plumes, or any other family, I only object to people compiling a catalogue under some fanciful idea of a law of priority, and applying it imperfectly to species only, and hardly recognising it as applicable to genera and families. For instance, if an entomologist describes an insect, and any book-worm thinks it unscholarly described, and thinks he can do it better, though he be but an indifferent entomologist, he will not have the name in his catalogue, but he will re-name it, and takes the entomological honour from the old entomologist, who did the work, and gives future entomological students no end of labour. See p. 119, Vol. 14, and p. 18, Vol. 17 *Entomologist*.

I think I said there was only one original idea in this list, and I fail to see any near relationship in the larvæ state between *C. festaliella* and any plume I know. I do not know any family in which the larva vary so much in their mode of feeding, or in their appearance, as the Plumes do, and I see

little difficulty in locating species near them, but I see an insuperable difficulty in placing them amongst any other family, in my present state of knowledge of the lepidoptera of the world. I shall retain them at the end of my collection, as in Doubleday's Catalogue. But do not please think I have overlooked the desires of other people. My plumes and most other families are arranged in separate drawers, so as never to run into each other, thus my Pterophori, 500 specimens, are all in one drawer, and my drawers being interchangeable, I can place them wherever my visitors like them best for the time being, and I have only to ask my visitors what group they should like to see next and we are at it at once. If our young friends will do this any arrangement can be made available; but as a new issue of H. Doubleday's list is sure to appear soon, with the additions that have been made and the same terminology, we may fairly hope English Entomological Nomenclature will be settled for some time to come.

This so-called law of priority is either good for all, or good for nothing; if good for specific names, then it is good for family and generic names. If applied to either, then it leads us direct back to Papilion, *Papilionidae*, genus *Papilio*—a butterfly; and to genus *Phalena*, Linn—a moth. What next? That the rule (not law) of priority should be worked within certain and well-defined limits is admitted by every one, but to carry any such rule or law to its natural sequence is absurdity exemplified. Guenée in his great work, quotes or rejects 95 authors, and gives his reasons for so doing; and *here is a base line* from which we have all worked, until some obscure author or compilers work, previously unknown, is unearthed, and then the whole foundation of our structure is to fall to pieces, to please the unfortunate old moles (not the advanced naturalists) who have found it. It may be said I am threshing a dead horse, but I say, don't leave a quiver-muscle or a hair of it alive, or the work must be done again—cremate it!

Rose Bank, Fletcher Grove, Edge Lane, Liverpool.

GREAT CAPTURE OF WATER BEETLES.

By J. J. NIXON.

In company with my friend Mr. S. Roberts, I took a stroll in search of water beetles, having been informed that they were to be taken in large numbers in a dyke which runs beside the Midland Railway near Little Eaton. When we arrived at the spot, we found the dyke covered by reeds and rushes, and quite dry, with the exception of a few spots that had been deepened to

allow the water to drain for the cattle. It was in one of these small pools that we commenced operations. We were provided with a large shallow can with which we scraped out the mud, and we were soon surprised at the great number of the fine beetle *Dytiscus marginalis* we turned up with every can of mud. We could have taken hundreds, but we satisfied ourselves by bringing away about forty fine specimens. We also turned out many water scorpions (*Nepa cinerea*), and one water boatman (*Notonecta glauca*).

Previous to this time, I had only taken one solitary specimen of *D. marginalis*, and as there is a little history attached to it, I will just relate it, in order to show the courage and voracity of these beetles.

About three years ago I was enjoying a day's outing with Mr. J. Hill, at Little Eaton. We had just concluded a good day's sport, and were returning home through a stubble field, when we noticed something moving rapidly along through the stubble. Closer observation proved it to be a sand lizard, which was making its way to a stone wall a few yards off. We tried to capture it, and after many vain attempts I darted my net before it and the capture was made, for the lizard ran into it, and as I had no further use for the net I tied the reptile in one corner of it, and so took it home. When I arrived at home I thought I would try and see how the lizard liked a water bath, so I put it into a small aquarium, the only inhabitant of which was the *D. marginalis*, aforementioned. I soon found that the lizard preferred an arenaceous element to an aqueous one, and it swam to the top and endeavoured to get out of the water; I, therefore, placed a narrow strip of glass over the top of the aquarium, and put the lizard upon it, placing a net over to prevent its escape. Next day I noticed that about an inch of the lizard's tail was nearly broken off. I could not discover how this mutilation had taken place. The poor little reptile whose eyes, the preceding day, were so bright, seemed quite dull and drooping. On looking an hour or two later the mystery of the broken tail was discovered, and the culprit found out. I found that the lizard was in the embrace of Mr. *Marginalis* in the aquarium, who was sucking away at a hole he had made in the abdomen of the lizard, his long legs being firmly attached to the body. I took them out of the water, and with some difficulty forced the beetle to quit its hold; and, of course, found the lizard quite dead. After seeing this sight I came to the conclusion that the beetle had caused the mutilation of the lizard's tail, and also the death of the reptile, and it must have been brought about in this manner. The glass slip was only about half-an-inch from the surface of the water, so that in turning round the lizard's tail would come in contact with the water. The beetle, seeing this, would make a grab at it, and in the struggle that ensued,

the lizard's tail would be sawn against the sharp edge of the glass.

But to return to my capture of beetles, I found I had taken two or three sorts besides *D. marginalis*, amongst others was *Hydrous caraboides*. Figuiet in his *Insect World* says of these beetles—"The *Dytisci*, *Cybister*, and the *Gyrinidæ*, or whirlgig beetles. These are perfect corsairs, whose rapacity even exceeds that of many of the land Coleoptera. Not content with devouring one another, when pressed by hunger, with attacking, especially the larvæ of all aquatic insects, such as the *Libellulæ* and *Ephemera*, they feed also on molluscs, on tadpoles, and small fishes" (and I may add, on small reptiles, when they can get them.) * * * The most carnivorous of this group are the *Dytisci* and the *Cybesters*. They may be called the sharks of the insect world. Nothing which lives in the water is safe against the voracity of the *Dytiscus*. They suck greedily the bits of raw meat which are thrown to them. * * * They are to be found in stagnant waters during the greater part of the year, but principally in autumn. During the winter they bury themselves in the mud, and under moss."

BRITISH BIRDS: THEIR NESTS AND EGGS.

By S. L. MOSLEY.

Genus I *Emberiza*.

EMBERIZA.—?

This genus of birds differs from those which have preceded it, and agrees with some which will follow in having the bill of a conical form, thick at the base and strong, adapted for cracking or husking seeds. In the present genus the lower mandible is as wide as the upper one, the edges of both being bent inward so as to give the bill somewhat the appearance of a pair of round-nosed pliers. A knob or tooth projects from the underside of the upper mandible. First primaries very short, the fourth being the longest in the wing. Tail, the outside feathers slightly longest. Generally the males are conspicuously or brightly coloured, and their appearance is different between summer and winter, not by any actual moult, but by the wearing away of the differently coloured margins of the feathers. We have few native species, all to be found throughout the year, but the first to be mentioned is much more abundant in winter than in summer. Five others have been recorded as accidental visitors.

65. SNOW BUNTING.

Emberiza nivalis, Linn.

Sno Sparf, (Sweden. Snefugle, (Denmark.)

Alap (Lapland.) Trapaluarsak, (Spitzbergen.)

NIVALIS.—Of the snow.

Plumage.—The adult male in summer dress has the bill black. Eyes hazel. Head, neck, and the whole of the under parts pure white, or with a few black feathers on the top or sides of head. Back jet-black, mottled, with grey on the rump. Upper wing coverts and secondaries white, or the latter blackish at the base; spurious wing black, primaries and tertiaries black, the former dusted with white at the base, and the latter upon the web. Middle tail-feathers black, the three outer ones white, with a black patch near the tip. Legs and claws black.

THE FEMALE IN BREEDING DRESS is similar to the male, but more shaded, with dusky on the head and upper parts.

THE ADULT MALE IN WINTER has the bill yellow, dark at the tip. Head and neck white, shaded with rust-brown and chestnut, caused by the margins of the feathers being of that colour. The back black, more or less obscured by the rust-brown edges of the feathers. The wings are similar to those of the summer bird, but the tertials are margined with dull brown. Upper tail-coverts black, with brownish or whitish margins. Tail like the summer bird. Lower parts dull white, tinged with rust colour on the breast and sides. Legs black.

THE FEMALE IN WINTER has the top of the head, chin, and throat dull chestnut, paler behind; the upper parts are mottled with blackish-brown and dull chestnut. The only white upon the wings is the lesser coverts, and the base of the secondaries. Tail as in the male, but duller. Under parts dull white, deeply shaded with dull chestnut across the breast.

In the winter dress it was formerly called the Tawny Bunting.

The change from winter dress to summer is caused by the brown edges of the feathers being worn away; and leaving them clear white or black.

THE YOUNG are at first covered with sooty down.

IN IMMATURE PLUMAGE both sexes have the bill yellow with tip dark. Head and upper parts greyish-olive, lighter towards the tail. All the white parts are tinged with grey or yellowish, and with rust-brown on the breast and sides.

Varieties.—The only one I have seen which can be classed as a variety is in Mr. Bond's collection. It is dull white, tinged with brown only at the sides of the head and breast.

Note.—The song of the Snow Bunting is described as being exceedingly lively and pretty. Mr. Seebohm in his *Siberia in Europe* says "They would fling themselves up into the air almost like a shuttlecock, singing all the time a low warble, not unlike that of a Shore Lark, or perhaps still more like that of the Lapland Bunting, and they would immediately descend in a spiral curve, with wings and tail expanded, and finish their song on a rock." A writer in *Science Gossip* (May 1870) describes the song of one that he kept in confinement, as being very like that of the Hedge Sparrow. The bird sang only during the night.

Flight.—They fly very close in flocks. Dr. Saxby says "Their flight is always in a compact body; and frequently before settling on the ground, they make sudden whirls, coming almost in collision with each other, at which time a peculiar note is produced. * * * Seen against a dark hill side or a lowering sky, a flock of these birds presents an exceedingly beautiful appearance, and it may there be seen how aptly the term 'Snow-flake' has been applied to the species. I am acquainted with no more pleasing combination of sight and sound than that afforded when a cloud of these birds, backed by a dark grey sky, descends as it were in a new shower to the ground, to the music of their own sweet tinkling notes."

Migration.—The bird is principally a winter visitor to these islands, arriving on the east coast about the end of October, or early in November, but individuals may be seen earlier. The first arrivals consist mainly of young birds and a few females. Their numbers seem greatly affected by the season; great numbers arriving in severe winters, while in mild winters very few are to be seen. Some remain here to breed.

Food.—Their principal food during their winter stay with us, is seeds of grass and other plants, especially those of *Schoberia maritima* and *Glaux maritima* upon their first arrival.

IN CONFINEMENT, canary, rape, hemp, millet and other seeds might be given, but the Snow Bunting is not a long lived bird in confinement, though they have been known to breed in captivity. Mr. Gregson, of Liverpool, has had thirty of them at once in his aviary, caught upon his Warren at Crosby.

Habitat.—This species frequents hilly districts, being found in winter on the coast and hills, and in summer on the mountain tops. As before stated,

it is a common winter bird in the north of Britain, especially upon the east coast, but in summer it is confined to the high mountains of Scotland, where it has been observed by Messrs. Nicholas Cooke, Harvie Brown, Wm. Hamilton, Macgillivray, Col. Drummond-Hay and others, the actual points of observation being the summit of Ben-na-muicdhui, Lochabar, Ben-y-Bhean, Craig Maige, and Lochnagar, as well as Banffshire, Ross, Aberdeen, Inverness, and by Dr. Saxby in the Shetland Isles.

ABROAD it has been found as far north as travellers have been able to penetrate. It is met with to the north of Spitzbergen, where few other passerine birds are seen. In Iceland it is the commonest small bird, and is met with in all seasons. It also breeds in the Færoes, Greenland, and Norway, but less commonly in Sweden. It is also known to breed in Lapland, North Russia, Siberia, and across the whole of the most northern parts of the New World. In winter it migrates southwards, and is then found in the South of Canada, Newfoundland, Nova Scotia, North of France, and North Germany, and occasionally even more south. Mr. W. Oxenden Hammond records (*Zool.* Feb. '81) the nest of a pair of Snow Buntings in a crevice under the sill of a window on one of the highest and wildest passes of the Maritime Alps," but it is possible that the birds observed by him were the Snow Finch (*Montifringilla nivalis*).

Nest.—The nest has several times been met with, and no doubt the birds breed every season upon the higher Scotch mountains, Dr. Saxby found it on several occasions in Shetland. It is placed among loose stones or rubbish, and is rather loosely constructed of dry grass, lined with finer grass, roots, moss, and feathers, generally those of the Pharmigan.

Eggs.—From four to six, and sometimes more are laid, the ground being greenish white, freckled, and sometimes streaked with red-brown, and lighter purple shades, with sometimes a few blackish lines. The green tinted ground-colour, with bright red and purple spots, render some of these eggs extremely beautiful.

HAGGERSTON

ENTOMOLOGICAL SOCIETY.

The half-yearly meeting of this Society took place on December 11th, 1884. The proceedings commenced by the Secretary reading his report for

the previous half year, after which the elections took place, the whole of the officers being reinstated for another Session, but the lamented death of Mr. Harper having left vacant the office of Treasurer, which he had held since the foundation of the Society, twenty-three years ago, it was necessary to fill up the vacancy, and Mr. J. A. Clark was duly elected.

The President (Mr. T. Hockett) addressed the members, urging them to continue to attend the meetings, and promote discussions, during the next Session, and upon the motion of Mr. J. A. Clark, it was decided to commence discussing the British Lepidoptera, taking each species in rotation. In accordance with this resolution the following meeting was devoted to the discussion of the life-history of *P. Machaon*, the subject being introduced by Mr. J. A. Clark; and Mr. T. Eedle, who perhaps has more practical knowledge of this species than other naturalist alive, gave many interesting particulars of his experience in the fens. The following Thursday Mr. Russell introduced the discussion on *L. sinapis*, and gave many particulars of his personal observations of the species in the New Forest. Many other members contributed to make the discussion of interest. *Pieris crataegi* has also had an evening devoted to it, and the discussion on the erratic *C. Edusa* is looked forward to with much interest. The veteran (Mr. Eedle) has promised to open the discussion on this species.

After mature deliberation this Society has finally determined to maintain their previous resolution with regard to Mr. South's list, and, therefore, both in the cabinets and minutes of proceedings, the Doubleday list will be used.
—ERNEST ANDERSON, Secretary.

GLASGOW PRACTICAL NATURALISTS' SOCIETY.

The usual monthly meeting of the above Society was held in the Religious Institution Rooms, Buchanan Street, on Wednesday evening, 14th January, at 8 p.m., Mr. T. J. Henderson (President), occupying the chair. The meeting was a very large one, the room being well filled. The first business transacted was the election of Mr. J. Iago, Langside, as an ordinary member, then Mr. John McKay proposed the following gentlemen as resident members:—Messrs. David Smith, James McCracken, Arch. P. Galloway, Govan, and Mr. J. M. Davies, Langside, and as a corresponding member, Mr. F. W. Halfpenny, West Ham Park, Essex.

Exhibits were invited, and several boxes of Lepidoptera were laid on the table for inspection. The librarian's box contained specimens representing the life histories of the following species :—*O. gonostigma*, *P. bucephala*, *O. potatoria*, and *A. caja*. Mr. McKenzie handed round for inspection several species of *Anodon*, which he procured from the Paisley canal (now filled up), and which have lived in confinement some eighteen months. Mr. John M. Campbell, Kelvingrove Museum, sent for exhibition a fine adult specimen of the rare Night Heron (*Nycticorax gardeni*), the ninth specimen recorded as having been found in Scotland. It was shot by Mr. W. Anderson Smith, at Loch Creran, Argyleshire, and sent by him to the museum for preservation. Mr. Henderson made some interesting remarks regarding this rare visitor, its haunts, and distribution.

The Secretary read a paper on "Collecting at Liverpool," by Mr. W. R. Hughes, Liverpool (cor. mem.), and which elicited some discussion. The Paper consisted mainly of accounts of rambles in search of lepidoptera in the neighbourhood of Liverpool. A hearty vote of thanks was accredited Mr. Hughes for his communication. A very interesting paper was then read by the Chairman, entitled, "Natural History as a Recreation," in which the essayist pointed out very clearly the benefits which are derived from the best of all studies—the study of nature—the most healthful of studies, refreshing as it does both mind and body. Mr. Henderson treated the subject in an interesting and practical manner; and the hearty applause which followed, showed how thoroughly the members appreciated his remarks.

The librarian acknowledged receipt of ten volumes, which Messrs. Henderson, McGrowther, and Spiers presented to the Society's library, and a vote of thanks was accorded these gentlemen for their kind gift.

The Secretary reported on the progress which had been made in compiling a list of the various species of lepidoptera which had been taken by the members in Scotland during the last few years. The list is not quite complete yet, but will record several species not mentioned in the list published under the auspices of the Glasgow Natural History Society. When completed it will be published in the local papers, as well as in the magazines devoted to the study.

The meeting dispersed at 9.45 p.m., after having arranged to remove to a larger room should the next meeting be so well attended as the present one. The Society is in a flourishing condition, the membership having more than doubled during the past few months.—JOHN MCKAY.

LEPIDOPTERA TAKEN OR SEEN IN THE NEIGHBOURHOOD OF BOCKLETON, 1884.

CONTRIBUTED BY MISS PRESCOTT DECIE.

IMAGINES.

n, numerous; *s*, scarce; *v*, very; *su*, sugar.

P. brassicæ, <i>n</i>	A. grossulariata, 1	T. fulva, 1
P. rapæ, <i>n</i>	L. marginata, 1	X. rurea, <i>s</i>
P. napi, <i>n</i>	L. didymata, <i>n</i>	X. polyodon, <i>s</i>
A. cardamines, <i>n</i>	L. pectinataria, <i>a few</i>	H. popularis, 1
M. artemis, <i>n</i>	E. affinitata, 2	A. basilinea, 2
V. c-album, <i>vs</i>	E. albulata, 6	A. gemina, 1
V. urticæ, <i>s</i>	E. succenturiata, 1	A. oculea, 3, <i>su</i> .
V. Io, <i>n</i>	E. castigata, 2	M. strigilis, 1
V. atalanta, <i>n</i>	E. lariciata, 2	M. arcuosa, <i>a few</i>
V. cardui, <i>n</i>	E. vulgata, 2	A. segetum, 1
E. janira, <i>s</i>	E. abbreviata, 1	T. orbona, 2, <i>su</i> .
E. hyperanthus, <i>s</i>	E. exigua, 1	T. pronuba, <i>s</i>
C. pamphilus, <i>s</i>	Y. elutata, <i>n</i>	N. glareosa, 2, <i>su</i> .
L. icarus, <i>vs</i>	M. ocellata, 1	N. augur, <i>n</i>
L. argiolus, <i>n</i>	M. montanata, <i>vn</i>	N. brunnea, 1
H. tages, <i>vs</i>	M. fluctuata, <i>vs</i>	N. festiva, 4
H. sylvanus, <i>vs</i>	C. propugnata, 1	N. baja, 1
H. linea, <i>vs</i>	C. unidentata, 1	N. xanthographa, <i>n, su</i>
M. stellatarum, 2	C. bilineata, <i>vn</i>	T. instabilis, 1
H. lupulinus, 2	S. dubitata, <i>s</i>	C. trapezina, <i>s</i>
H. humuli, 5	C. miata, 1	P. chi, 1
N. mundana, 1	C. russata, 2	E. lucipara, 1
A. menthastri, 1	C. immanata, 1, <i>su</i> .	A. nebulosa, 1
U. sambucata, 3	C. fulvata, 4	H. dentina, 1
R. cratægata, <i>n</i>	C. suffumata, 4	P. pulchrina, 2
P. syringaria, 3	C. pyraliata, 2	P. gamma, <i>vn</i>
O. bidentata, 1	C. mensuraria, <i>n</i>	G. libatrix, <i>s</i>
A. scutulata, 1	C. palumbaria, <i>s</i>	A. tragopogonis, <i>n</i>
A. bisetata, <i>n</i>	A. psi, 1	E. glyphica, <i>s</i>
A. aversata, 2	L. impura, <i>n</i>	E. mi, <i>s</i>
A. pusaria, 1	L. pallens, 3	
C. exanthemaria, 1	H. nictitans, <i>s</i>	

In the early part of the spring we were away from home and so did no collecting at the Sallows. We sugared several times in June without any success. In fact the only night that insects came to sugar was August 22nd. During August, in spite of the hot weather, there were very few butterflies, even such species as *E. Janira* and *C. pamphilus*, usually so abundant, being scarce.

REARED FROM LARVÆ TAKEN AT BOCKLETON.

M. artemis, v n	C. brumata, n	T. populeti, 6
V. c-album, 3	L. didymata, 1	S. satellitia, 1
C. ligniperda, 1	O. dilutata, 1	X. cerago, 3
A. mentastri, 2	C. russata, 1	T. subtusa, 3
O. pudibunda, 5	C. corylata, 1	C. trapezina, n
S. illunaria, 2	P. bucephala, 1	C. affinis, 1
O. bidentata, 1	D. cæruleocephala, 1	E. viminalis, 6
A. prodromaria, 2	A. psi, 1	A. aprilina, 2
C. pusaria, 7	A. megacephala, 2	P. meticulosa, 1
C. exanthemaria, 1	A. rumicis, 1	H. pisi, 3
L. marginata, 1	M. brassicæ, 4	C. exoleta, 1
H. progemmaria, 1	T. gothica, 1	P. gamma, 1
A. æscularia, 1	T. stabilis, 3	N. typica, 1

LARVÆ.

M. artemis, v n, Scabious

V. c-album, v s, Hop

V. Io, n, Nettle

S. populi, 1, Poplar

C. caja,

C. mentastri, Nut

E. lanestris, s, Hawthorn

O. potatoria, 1, This larva was taken May 21st, when it seemed about half grown, but instead of feeding up, and spinning at the usual time, it has scarcely grown at all, though it seems quite healthy, and has been feeding a little through the autumn and winter.

C. pusaria, a few, Alder &c.

A. grossulariata, 1

H. rupicaprararia, n, Hawthorn, &c.

H. progemmaria, Oak, &c.

H. defoliaria, n, Oak, &c. (These larvæ were much less common than in 1883.)

C. brumata, v n, Oak, Maple, &c.

O. dilutata, a few, Oak, &c.

L. didymata, v n, Primrose (We took a few also feeding on Greater Stitchwort, and one on Chickweed. Newman and Stainton mention only one food plant (the Common Chervil) for the larvæ of this species, but till last spring we had never taken them on anything, but either the flowers or leaves of the Primrose.

Y. elutata, n, inside Willow Catkins

A. derivata, a few, Wild Rose

C. russata, 1

C. spinula, a few, Hawthorn and Blackthorn

D. furcula, 1, Willow

D. cæruleocephala, 1 Hawthorn

A. megacephala, 1, Poplar

A. rumicis, Hop

- T. fimbria, 1, Oak
- T. populeti, n, Poplar
- T. stabilis, a few, Oak
- S. satellitia, 2, Oak
- P. silago, 3, Inside Willow Catkins
- P. subtusa, a few, Poplar
- C. trapezina, n, Oak, &c.
- C. affinis, 1, Alder
- E. viminalis, 6, Willow
- A. aprilina, 5, Oak and one on Birch
- H. pisi, 1
- P. meticulosa, 2, Dock
- C. exoleta, 1
- P. gamma, 4.

We found several batches of ova of some noctua on grass stems in September, nearly all were on those of *Aira cæspitosa*, and were very neatly aranged and closely packed. We did not succeed in rearing any of the larvæ, though at first they grew very well, so we are not sure of the species. On the whole we found larvæ scarce throughout the year, but especially so during the autumn.

NOTES AND OBSERVATIONS.

WEASELS CLIMBING TREES.—Towards the end of September last year, I had a somewhat curious adventure with a Weasel. While walking about I observed a Weasel running along with a Rabbit. Being out of shot I instantly gave chase, upon which the Weasel dropped its prey and went to ground at the foot of an Elm tree. I stopped the hole with a brick and returned in the course of an hour with a spade. We dug to within a foot of the end of the hole. The Weasel then bolted round the tree with my terrier in hot pursuit. Being hard pressed the former ascended the tree with such rapidity, that on reaching the opposite side the only evidence of the ascent was my dog's repeated efforts to follow. We watched for about half-an-hour, but owing to the thick foliage were unable to see it again.

On December 19th, whilst out shooting, I was surprised to see the same terrier jumping and trying to climb an Elm tree. Looking up I saw a Weasel running up with the facility of a Squirrel, and shot him. These little vermin have certainly been in greater numbers than usual in these parts during the past year. I well remember one moonlight night in August seeing three or four playing and chasing each other outside a cover. This cover had been cleared of Brushwood in the spring, and there were several

piles of faggots outside it. Upon the removal of these heaps the bones of about forty or fifty Rabbits were discovered.

THE BITTERN (*Ardea stellaris*).—This bird once so common, but now so rare in England is not quite extinct yet. One was shot at Houghton Whale in Huntingdonshire, on November 27th, 1884.—ALBERT WATERS.

Berwick in his "Quadrepeds" mentions the agility of Weasels in ascending walls, perhaps some of your readers are as ignorant as I was of their tree climbing powers.—R. J. ATTYE, Stratford-on-Avon.

HYBERNIA RUPICAPRARIA.—I find that by referring to my note book for 1881, that although the winter then was of a most severe description, this moth was seen by me in profusion, and it was possible to have taken almost any number. I have remarked, however, that I have never seen it flying while the ground was covered with snow, and a sharp frost prevailed. I am inclined to think it seeks shelter in stacks, or sheds, or outhouses at such times, as I have frequently seen it in the latter. Of course, this can only apply to male moths: where the wingless females get to I do not know, unless they crawl down to the ground.—ALBERT WATERS, Cambridge.

WINTER MOTHS.—My observations last year on these moths were as follows:—*Hybernia rupicaprarica* first seen January 7th; *Hybernia progemmaria* "abundant" February 7th; *Hybernia leucophearia* February 18th; *Hybernia defoliaria* October 10th; *Cheimatobia brumata* October 18th.—ALBERT WATERS, Cambridge.

THE GENUS HYBERNIA.—In your leading article of last month, you most truly refer to the great interest attached to this genus of moths. It is not the object of this note to attempt to answer the queries you there set forth, but merely to give, as you invite, a few of my observations on the subject. As I write the snow is lying on the ground, and everything speaks of winter, and yet within this last week *C. brumata* and *H. rupicaprarica* have been flying along almost every hedgerow, and *defoliaria* is equally abundant on the pailings. *Rupicaprarica* emerged with us at its usual date, January 1st, and was fairly common, but I think the frost and snow of this last few days must have proved too much for it, but really there is no telling, for on the 6th inst., during a temporary change of the wind, I found several hanging on the whitethorn buds in a small thicket, the ponds at the same the same time being thick with ice, and the remains of a snow storm being still on the ground, but they were all males, the females not having turned up as yet. It seems to me that the *Hibernidae*, unlike most lepidoptera, are not influenced by the heat or cold, but appear each species to have an allotted period in which to remain in pupa, which time being expired, they emerge, no matter if be hot or cold. Some larvæ of *defoliaria* reared from young larvæ, emerged

in my breeding house on November 31st, and the next day some pupa which pupated on the same date as the above, but which were kept in a heated room, were hatched, the only difference being that those that were kept at about their natural temperature, were all of the unicolourous form, those to which heat had been applied being without exception the light creamy, with a dark band round. This has led me to think it probable that the temperature in which the pupa is placed may have something to do with the great variety that occurs in this species. *Leucophearia* will soon be out with us if the snow goes, and I intend closely observing them for anything that may aid us in this mystery.—WILLIAM P. ELLIS, Enfield Chase.

A NEW GEOMETER.—On October 20th I bred a Geometer, which I did not know, and which I exhibited at our Lancashire and Cheshire Entomological Society, but could not get named. Last week I submitted it to Mr. Gregson, and he informed me it is *Oporabia approximaria* (Greg. N.S.), of which he had a long series. He says it should be included in the new list you are about to publish, between *dilutata* and *fligrammaria*.—F. N. PIERCE, 143, Smithdown Lane, Liverpool, January, 1885.

[I do not find a description of this species in any publication to which I have access, and shall be glad to have the reference if there be such a description. If it has not been described, it ought not to be named, and cannot be included in the forthcoming list.—*Ed.*]

THE LUMP FISH IN CAMBRIDGESHIRE.—A very fine specimen of this singular fish was taken at Wisbeach about a fortnight ago.—ALBERT WATERS.

WASPS DEVOURING FLIES.—During the last two or three summers I have frequently observed a proceeding of a colony of wasps, which may be interesting to your readers. There is a brick pig sty about two hundred yards from the wasp's nest, and on bright sunny days large numbers of flies sun themselves on the wall, and on the backs of the pigs sleeping in the sun. The wasp hovers about marking out his prey, and swoops down on the back of a fly, a few seconds spent in clawing it over gives the quietus to the fly, then a few more seconds is spent, apparently, in seeking the juices from the body, and lastly it is dismembered, the carcase and legs are dropped, but the wings of the fly are invariably carried home to the nest of the wasp. The operation only occupies about half a minute, and a constant succession is kept up for hours. I am not a naturalist, and probably this observation is generally known to those who are, but generally, the only useful quality credited to the wasp, is that of providing bait for anglers.—THOS. A. BELL, Warbeck Park, Amtree, Near Liverpool.

ERRATA.

Page 18. 7th line from bottom, delete last three words.

Page 20. 7th line from bottom and last word, for *us* read *no*.

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THE COMMON SMOOTH NEWT.

(*Lophinus punctatus*.)

By W. H. WARNER.

POOLS, ditches and ponds are the spring haunts of this beautiful little reptile, and of these perhaps the preference is given to the first mentioned. Quarry pools seem to be a very favourite resort of the smooth newt, and in most of these it may be found from early spring till well into summer, or even later. Though this species, and its larger relative the warty newt (See *Young Naturalist* Vol 5, p. 199), are often found in the same pool together, yet I have an idea that the smaller species does not care about the near proximity of its big congener. Thus, in a certain quarry-pool in Berkshire, I am almost always certain of meeting with *punctatus* in abundance, but seldom see a *cristatus* anywhere near. In this pool I once liberated an exceedingly lively pair of these smooth skinned newts, which, after travelling all the way from Ireland, turned out of the damp *anacharis* in which they were packed, and swam as freely in the Berkshire pool as if they had been bred there.

The present species is the most common of all the newts, and is found in every part of the United Kingdom, even Ireland, where in some districts it is very common indeed. Newts as a rule are never found in other but lowland waters, but among the mass of notes I have collected in reference to the British Reptiles, is one in which it states that a newt was taken in 1882, in a pool on Cader Idris, one of the Welsh mountains, two thousand feet above the sea level. My authority does not give the species of newt which was taken in this elevated situation, but most probably it would be the present species. The smooth newt, like its bigger relative, appears very early in the year. Some are seen on land at this time, and others in the water. I once saw a female moving about among the plants in a flower bed so early as January 30th. But the end of February or the beginning of March may be set down as the time for the appearance of our newts, both in the water and on land. The habits of the smooth newt in the water do not appear to be materially different from those of the warty kind. Its food

consists of small worms, insects and their larvæ, &c., &c. When particularly hungry it has been known to indulge itself with a juvenile tadpole.

In April and May, the smooth newts, which are leading an aquatic life, put on their gayest attire, the male newt at this time being especially conspicuous, with his bright colours and markings, set off as it were by the crest or web running down his back and tail. He may often be seen now resting on the top of floating grass or weeds, and seeming to enjoy the warmth of the early spring sun. Later on, viz., about May or June, the female deposits her eggs. Like the warty species the eggs are carefully disposed of, each egg being folded up in the leaves of plants, as the following note from my diary will show:—June 4th, 1874—“In my investigations in the sandpit pools, Seven Acres Field, this evening, I found a bundle of willow twigs lying in one of them, and on the twigs some of the narrow leaves of the willow still green. A bunch of these which were submerged, I took up, and saw about a quarter of an inch of the ends of most of them folded over and tightly glued down. Raising the fold up with my pocket knife, I found a small, clear, oval, jelly-like egg between, in which was a small greenish-white object like a tadpole, I then knew them to be the nearly hatched eggs of this newt, several of which were resting on the bottom of the pool. Bunches of ordinary broadish-bladed grasses hung over and in the pools, the blades of which the newts had utilised, some of the blades having been folded two or three times, and an egg enclosed in each fold, I noticed four eggs placed at intervals along one grass-blade.” Other observers have said that the eggs of this newt are not always folded in the leaves of plants, but are sometimes laid on stones or at the roots of water-weeds.

The egg of the smooth newt when first extruded, is oval, jelly-like, and transparent. In about three weeks time the folds of the enclosing leaf begin to open, caused no doubt by the expansion of the egg, and a pale-coloured tadpole with bright black eyes is ushered into the watery world. It is a most active little creature, darting about in the water with great rapidity. In process of time the forelegs make their appearance, then the hind ones, and a perfect but diminutive newt is the result. Its growth is very gradual, competent observers saying that when three months old its length is only about an inch. In June and July many of the newts both large and small leave the ditches and take to the land. I have often seen this small brown eft slowly picking its way among the plants in our flower-beds, and when a boy always imagined it to be a lizard.

Like the warty species, the smooth newt often changes its skin, generally concluding the operation by swallowing its cast-off clothes. A careful observer (Mr. C. Robson, of Newcastle-on-Tyne) once discovered a tadpole

of this newt divesting itself of its cuticular covering, and in a short time after making a meal of it.

The smooth newt, in common with the whole tribe, is the victim of many superstitious notions, particularly in that reptile-hating country, Ireland. A correspondent in that latter country writes to me thus:—"The newt (called "dark lewker" in Ireland) has several supernatural qualities ascribed to it, as for instance, jumping down a person's throat if the mouth happens to open in its presence, and then consuming all food swallowed by the patient till the latter dies of a lingering decline. Like the salamander also it is said to be able to stand fire." He writes again—"The meaning of the word "dark lewker" I do not know, but it is connected with the devil. The only remedy (*i.e.* for newt in the stomach) is for the patient to go to running water, or better still a dairy, the intruding reptile being unable to withstand the temptation of a drink, particularly milk. The Donegal name for the newt is "man eater." He again writes—"I learn that a popular belief here is that licking a newt three times is an infallible cure for a burn."

The smooth newt is a great favourite with keepers of fresh water aquaria, and few are complete without a pair of these graceful little creatures.

In autumn they retire to hibernate, and are often found then and during the winter months coiled in company under stones and similar places. I once found a specimen of this little reptile in a torpid state under a heap of rubbish. This was in October. Its colour was pale brown above and red below, and it had a lively eye which was not closed. It made no movement on being touched.

The following is a description of the smooth newt.—The adult newt varies in length from three to four inches. Its skin has no warts or tubercles like *cristatus*, but is perfectly smooth, and it is by this means easily distinguished from that species. The upper parts in the male are brown of varying shades, spotted with black, and a light yellowish line runs under the eyes. The underparts vary from yellowish to orange or even red, the latter colour being chiefly noticeable in the breeding season. The underside is likewise spotted with black. The female, especially when on land, is a very different creature from the male. Its colours are altogether duller and plainer, and the black spots are few in number, and very indistinct. The smooth skin and smaller size of this species easily distinguishes it from the warty species. The difference between this and the other smooth newt, *Lophinus palmatus*, will be pointed out when we come to that species. Not knowing anything of the latter's habits and distribution from personal observation, I should be glad of any information respecting it from the readers or contributors of the *Young Naturalist*.

Standlake, Witney, Oxon.

THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

MARCH.

Spring is coming! The lengthening days, the cheerful light,
Proclaim its advent near. And the frosts are keen,
The winds do fiercely blow, and rains abundant fall,
'Tis only winter's last convulsive grip to hold
What he must part with soon. Prepare then for the work
Which spring provides for active hands.—*Anon.*

EVERYONE is familiar with the meteorological surroundings of March, and there is no need to describe them other than very briefly. Some days are perhaps beautifully bright and genial, the brimstone and tortoise shell butterflies come out and revel in the warm rays of the sun, we see the lady-birds and humble bees about, and we see the beetles running about in the sunshine with elytra glittering like gold, the birds sing triumphantly over the defeat of winter, buds and blossoms break and all nature smiles; but then, alas! comes a change; the east winds blow with chilling force and winter is again the conqueror. Possibly the weather vane shifts round to the north, and frost and snow are as much the order of things as if it were January. Then again the genial south winds blow and winter once more retires before the coming spring, the tallows bloom and the entomologist finds the time has come when he must be up and doing.

On one of these bright days the coleopterist will find much occupation. All the *Carabi* may still be found, and we may see the tiger beetles also actively moving about in the sun. The natural history of the *Cicindelidæ* is very interesting, and I will say something about it next month. I will content myself this month with merely alluding to it.

The beetles we shall find in March are, generally speaking, such species as we have been turning up all the winter, as, for instance *Carabus violaceus*, *Carabus monilis* and others of the genus, *Harpalus ruficornis*, *Harpalus æneus*, *Anchomenus albipes*, *Anchomenus prasinus*, *Bembidium æneum*, *Bembidium rufescens*, *Amara communis*, *Amara apricaria*, *Aleochara fuscipes*, *Pterostichus niger*, *Pterostichus madidus*, *Pterostichus cupreus*, *Aphodius ater* and other *Aphodii*, together with many others which I have not room for, but some of which have already been mentioned in preceding months. I am sorry I can do no more than merely give a list of names, but several of them will be found figured in the plates, given with the last two volumes of the *Young Naturalist*.

The principal work of the lepidopterist in March is at the tallows and larvæ hunting at night with a lantern. Of course all the members of the

genus *Teniocampa* should be looked out for at the sallow bloom, and I should have a great deal to say about them, but as they were all described and figured in this magazine last year (see April number) I think it unnecessary to say more now.

The *Teniocampæ* are not the only moths we may see now at the sallows, for *Trachea piniperda*, *Cerastis vacinii*, *Cerastis spadicea*, *Scopelosoma satellitia*, *Dasycampa rubiginea*, *Hoporina croceago*, *Calocampa vetusta*, *Calocampa exoleta*, *Xylina conformis*, *Xylina rhizolitha*, *Xylina semibrunnea*, *Xylina petrificata*, *Gonoptera libatrix*, *Hybernica progemmaria*, *Anisopteryx æscularia*, *Cidaria miata*, *Cidaria psitticata*, *Anticlea badiata*, *Scopula ferrugalis*, &c., also visit them, and we may occasionally observe *Xylocampa lithoriza* also. *Brephos parthenias* often flies about the sallow bloom in the day-time in the neighbourhood of birch woods.

We may also try sugar on mild March evenings. The moths we may expect to see at the banquet we provide them are *H. croceago*, *C. vetusta*, *C. exoleta*, all the members of the genus *Xylina*, the hibernated Herald Moth (*G. libatrix*, which we may also find at rest on palings), *H. rostralis*, and occasionally *C. miata* and *C. psitticata*; some, if not all of the *Teniocampæ* also come to sugar.

Light will attract *Dasypolia templi*, *Selenia illunaria*, *Phigalia pilosaria*, *Amphydasis prodromaria*, *Hybernica rupicaprararia*, the before mentioned *A. æscularia*, *Cidaria fluviata*, *Scotosia dubitata* and *S. ferrugalis*. The first named species we also obtain by turning over stones in its localities.

We may also find the following moths in mild weather in March, resting on palings, viz :—*Cymatophora rideus* (at the end of the month in mild seasons), *X. lithoriza*, *P. pilosaria*, *A. prodromaria* (and oak trunks), *Tephrosia crepuscularia* (and on larch trunks), *H. leucophearia* and *H. progemmaria* (also tree trunks), *Larentia multistrigaria* (behind tufts of grass), and we may also find *A. æscularia* on both palings and tree trunks and in similar situations in the day-time.

When larva hunting at night with a lantern you will probably find the greenish-grey caterpillars of *Mania typica*, with oblique whitish streaks and a whitish line along each side, feeding on docks. The other larvæ you will probably come across are *Tryphæna orbona* and *interjecta* on low plants, and you may perhaps find some of the following :—*Aporophylla australis* (if you live in the localities where it occurs) on low plants, *L. testacea* and *A. unanimitis* on grass (the former on the lower part of the stems), *T. fimbria* and the local *T. subsequa* on low plants, also *M. furva* on grey hair grass (*A. canescens*) with *C. alsines* on chickweed (*Alsines media*) *L. impura* on sedg (Carex) and *L. straminea* on grasses. The last is local and rare.

Besides these *Bryophila perla* and *glandifera* which occurred last month may still be found feeding on lichens, and *A. basilinea* on low plants.

Several butterflies which have hibernated in the winter come out on mild days in March as the Brimstone (*G. rhamni*), the Peacock (*V. io*), the Large Tortoiseshell, (*V. polychloros*), the common Tortoiseshell (*V. urticae*), the Red Admiral (*V. atalanta*), the Painted Lady (*C. cardui*), the Comma (*V. c-album*), and the Camberwell Beauty (*V. antiopa*).

A CATALOGUE OF BRITISH LEPIDOPTERA AND THEIR NAMED VARIETIES.

By JOHN E. ROBSON.

(Continued from page 15.)

PLATYPTERYX

Lacertula

A Northern form of this insect, which Staudinger considers a variety in Lapland and an aberration elsewhere, is called *Scincula*, Hub. He describes it as being larger and greyer than the type. I have a dingy looking specimen that may be this form, or an approach to it.

Sicula

Falcula

A pale form is called *Pallida*, White, but it is not recognized by Dr. Staudinger.

Hamula

There is a variety of this species called *Uncinula*, Bkh. It is paler, and has rather a violet shade. I do not know of its occurrence here

Unguicula

CILIX

Spinula

CERURA

Bicuspis

Furcula

A specimen with the band very broad was described by Curtis as *C. latifascia*. It is not worthy of a distinguishing name.

Bifida

Vinula

STAUIRUPUS

Fagi

Very dark specimens of this insect are met with rarely, but they have not been named.

PETASIA

Cassinea

Nubeculosa

PYGÆRA

Bucephala

CLOSTERA

Curtula

Anachoreta

Reclusa

GLUPHISIA

Crenata

PTILOPHORA

Plumigera

PTILODONTUS

Palpina

NOTODONTA

Camelina

Cuculina

Carmelita

Bicolora

Two varieties are named, one with the wings all white is called *Unicolora*, Men.; another, intermediate, is called *Albida*, B. They occur in Russia, &c.

Dictæa

Dictæoides

An obscurely marked Northern form is called *Frigida*, Zett.

Dromedarius

Two varieties have been named, *Dromedarulus*, Haw., and *Perfusca*, Steph., but they are now recognized.

Tritophus

Ziczac

Trepida

Chaonia

Dodonea

DILOBA

Cæruleocephala

An Armenian form, with ashy-grey wings, is called *Armena*, in Staudinger

THYATIRA

Derasa

Batis

CYMATOPHORA

Duplaris

I have some dark specimens of this insect, I believe, from Rannock.

If the form is constant it would be as well named.

Fluctuosa

Diluta

A very well marked variety of this species occurs in this county (Durham), always much darker than any others I have seen, and often has four distinct dark bands. A figure of this form is given in Newman, who notes that the species is not given to variation.

Ocularis

Flavicornis

Ridens

Very variable, but no constant forms.

BRYOPHILA

Glandifera

v. *Par*, Hubner. Paler and less distinctly marked. This is given by South as a Species. There is as much difference between northern and southern specimens of *Perla* as there is between *Glandifera* and *Par*. It seems to me, to be what may be called a Dealer's species.

Algæ

Perla

DIPHTERA

Orion

v. *Runica*, Haw. Newman figures the two forms of this insect. The same black marks are found in both, but they are a little more distinct in one than the other. He thinks "it is very probable there are two species combined under one name, and require separation." No one else seems to think so, but some one who rears the insect should settle the question.

ACRONYCTA

Tridens

Psi

The difficulty of separating these species is well known, but the com-

mon name of *Tridens* is "The dark dagger," and of *Psi* "The grey dagger." If a row of each be placed side by side, and they be looked at from a distance too great to notice the exact markings, the darker hue of *Tridens* is easily seen, I also think it looks rather browner. Newman, who professes not to know why *Tridens* is called "The dark dagger," and to be unable to distinguish them, gives a figure of each in which the difference is shown with great clearness.

Leporina

v. *Bradyporina*, Tr. Ground colour grey, not white.

Aceris

v. *Candeliseque*, Esp. }
Infuscata, Haw. } darker grey.

Megacephala

Strigosa

Alni

Ligustri

v. *Coronula*, Haw. I do not know this variety, unless it is the dark form without the paler patch near the tip.

Rumicis

v. *Salicis*, Curt. Darker and more uniformly coloured. I have one with quite a brown shade.

Auricoma

v. *Pepli*, Hb. Darker and more unicolourous. I do not know if this is the v. *Menyanthidis*, of Haw.

Menyanthidis

Staudinger gives a var. *Salicis*, Curt. of this species, as occurring in this country. This appears to be in error for the var. of *Rumicis* of the same name which he does not give. South gives *Salicis*, Curt., as a synonym of *rumicis*, which it certainly is not, and falls into the further mistake of copying Staudinger's error in this species.

ENTOMOLOGICAL NOMENCLATURE.

By G. COVERDALE.

MR. C. S. Gregson criticising the *Entomologist* list in the February part of this magazine, seems to think the adoption of the new genera in the *Pterophoridae* a violation of the law of priority. He says "Does it not appear

plain that this so-called law of priority should have prevented Mr. South from adopting Wallengren's recent division of the old genus "*Pterophorus*" into *Amblyptilia*, *Mimæseoptilus*, &c., &c., surely if this so-called law is good for specific names, then it is good for generic and family names." *Pterophorus* was the name given to the whole of the plume moths, and any name to be synonymous with *Pterophorus* must embrace in its definition the same species. But all the new genera are constructed to include only a small part of the species embraced by *Pterophorus*, and a part cannot be the same thing as the whole. The greater includes the less, but it is not synonymous with it. If any future author should propose to split up *Eupithecia* into half a dozen new genera it would be no violation of the law of priority. When synonyms occur in generic names they are treated in the same manner as those in specific names

Mr. Gregson fails he says to see the relationship between *C. festaliella* and the plumes!! "I see little difficulty in locating species near them, but I see an insuperable difficulty in placing them amongst any other family," which can only mean that although there are other species closely related to the plumes, the plumes are not closely related to these other species. The author's intention here is not very obvious. One thing, however, most will admit, the *Pterophoridae* are not closely related to the genus *Nepticula*.

Fleming Road, Lorrivmore Square, S.E.

To the Editor of the Young Naturalist.

DEAR SIR,

Will you kindly permit a Young Naturalist to say a few words on the question of Scientific nomenclature? In spite of what so great an authority as Mr. C. S. Gregson maintains on the other side, it seems to me to be obvious that, if we use the Latin language for purposes of nomenclature, we ought, at least, to make an attempt to see that the Latin words we use are properly constructed. For instance, it would not have been very difficult for Mr. Gregson to have found out, before naming one of his many captures, that *Britannodactylus* was certainly more correct in form than *Britainadactylus*,* though, I am afraid, this six syllables make both words rather clumsy. We have no more justification for abusing the Latin language than we should have for mis-spelling our mother tongue. Ignorance in either case may be pleaded as an excuse, but the ignorance which contents itself with sneering at learning is thoroughly contemptible.—I am, yours faithfully, HERBERT CHITTY, Balliol College, Oxford.

* See the *Young Naturalist* for February 1885, p. 34.

ARE BUTTERFLIES DISAPPEARING FROM THE BRITISH ISLES?

By JOHN E. ROBSON.

MOST of entomologists commence by collecting lepidoptera, and all beginners give their first attention to the Butterflies. Not only are they few in number, and many of them attractive in appearance, but they fly by day, and thus are more easily found by the inexperienced collector, who has not learned the various modes of capturing insects after dark. Besides this, they are first on the list, and when the young lepidopterist begins to arrange his collection, he of necessity commences with the butterflies, no matter what arrangement he may select for the sequence of the other groups. He quickly obtains all that are of general distribution. Those abundant locally are soon got in exchange, but the rarities can only be got by purchase, or at very uncertain intervals. By this time he has gained a little knowledge of the other groups, and his attention becomes diverted from the butterflies, just at the time when he has acquired sufficient experience to have enabled him to make discoveries if there were any to make, or at all events to make observations worth recording. If he remains merely a general collector there is enough to do among other groups, and the little that might be done among the butterflies is neglected. If he becomes really an entomologist, it is still one of the larger groups, perhaps the Tinea or Tortrices that attract his special attention, or he may take up a smaller section, the Pugs or the Plumes, and endeavour to work out something new. Larva figuring or describing, pupa digging or some less restricted range of labour may absorb his energies, but whatever it is he does not return to his first love, the butterflies. Few indeed have reared half, nay quarter of them from their earlier stages. Few are acquainted with the larva of so common an insect as the Meadow Brown or any of the *Satyridae*, *Lycenidae* or *Hesperidae*, and it is a fact that less is known generally about the life history of our butterflies than of any other group. In conducting the *Young Naturalist* for the past five years, I have naturally been brought into communication with a large number of beginners, and the constant enquiries about butterflies led me first to know how ignorant I was about them, and next to give more attention to them than I had done previously. Among other points the rarity and irregular occurrence of certain species were the subject of many enquiries, and I have been led to conclusions regarding some of them that are not generally received. If these conclusions be correct, they point to a time not very far distant, when a large proportion of our butterflies will have ceased to exist as natives, and

the collector of that day may only expect to fill his series by the chance occurrence of immigrants or from Foreign examples. There seems equally strong reasons to believe that butterflies were formerly much more numerous here, and that most, if not all of the "reputed" species, were at one time true natives of our islands, along with many others of whose occurrence no record exists. I will deal first with the existing list, and I will endeavour to classify those I name under different heads.

The British Butterflies as at present on our lists are sixty-four in number.

1. EXTINCT (1).

POLYOMMATUS HIPPOTHÆ was formerly abundant in some of the fens. It has not been taken for quarter of a century, and is not likely to be met with again. The fens have been too carefully collected over, for it to be possible that it should still exist in any unexplored portion. It does not occur on the Continent in the same form as the English type. The Continental form is known as *var. Rutilus*, and is far from common. Indeed, London dealers appear to have a difficulty in obtaining it to sell as "types," for some send out *P. Chryseis* instead.

II. IMMIGRANTS THAT DO NOT BREED HERE (3).

1. *PIERIS DAPLIDICE* occasionally crosses from the French coast to the nearest English land. Only the second brood even appears to reach us—perhaps the migrating tendency does not obtain with the first. Eggs may occasionally be deposited, but there is no evidence that I have seen to lead us to think they ever reach maturity. The species must have been more abundant formerly, for it is called the Bath White, which points to its occurrence in the neighbourhood of Bath, as a matter of general knowledge, and it never seems to reach that district now.

2. *ARGYNNIS LATHONIA* is equally rare with the last, and reaches our shores in an equally uncertain manner. Whether the eggs are deposited or not we cannot tell, but they certainly do not reach maturity often.

3. *VANESSA ANTIOPA* appears to come to us from Sweden, at least such is the opinion of no less an authority than Mr. Stainton. It does not come singly like the other two, but in a large swarm, which spread themselves all over the country. Hundreds of specimens are sometimes taken when this occurs. At other times only a few reach us, and but one or two are taken, but that these are part of a larger flight, is evident from the fact that they are found in widely separated places. This species sometimes hibernates here, but it is rarely seen in the spring. I have in my collection an example that came out from some brush the woodmen were burning near Castle Eden, in the month of February. I believe the larvæ has never been taken here, and after the

largest flight the species is rarely seen the next year. The common name of this species, the Camberwell Butterfly, also points to a time when it was commoner than now, and had at least one recognised locality.

III. IMMIGRANTS THAT BREED HERE BUT SEEM UNABLE TO PERPETUATE THEIR RACE (2).

These are the two Clouded Yellows, *COLIAS HYALE* and *EDUSA*. The former of these (*Hyale*) appears at very uncertain intervals. Sometimes like *Daphidice* and *Lathonia* it crosses singly, at others a swarm of greater or less magnitude reaches us. When a large flight arrives in the early part of the season they will breed here, and the second brood appears in due time. But few are able to survive the winter, and after the largest flights the species seldom appears the next spring. *Edusa* is evidently hardier than its near relative, and sometimes lingers on for several generations in our southern counties. In the last great "*Edusa* year" it certainly bred in some numbers in this county (Durham), one of the most northern and exposed of all. But it seems unable to maintain its footing in the Island, and but for immigration it would soon be numbered with the extinct species.

IV. SPECIES THAT ARE RAPIDLY DISAPPEARING (3).

1. *LYCÆNA ACIS* has long been among our rarest natives. Many localities are named by older writers where it no longer occurs. I do not personally know of any place where it can now be taken. The last I knew of was at Penarth, near Cardiff, but the fields where it was taken are now built on. Possibly there may be some similar places in the neighbourhood where it might still be found, but if not extinct it soon will be.

2. *LYCÆNA ARION*. After the full account of the disappearance of this butterfly, in the *E.M.M.* for last year, it is unnecessary for me to enlarge upon it here. It may, of course, re-establish itself in its old localities or some of them, if we had a few favourable seasons, but it is evidently doomed to early extinction.

3. *THECLA PRUNI*. I place this species under this head with some hesitation, for I really know very little about it. It was only added to our list within the time of the present generation of Entomologists, and it has never been either common or widely distributed.

V. SPECIES WHOSE RANGE IS BECOMING RESTRICTED (11).

Under this head I am obliged to place several common species, and as the list is long, I will make my remarks on each as brief as possible.

1. *PAPILIO MACHAON*. Formerly extending northward to Beverley at least, (see Porritt's "*List of Yorkshire Lepidoptera*"), and once a common

garden insect in the suburbs of London. Now entirely confined to the fens, and as they become drained and cultivated it will certainly disappear.

2. *PIERIS CRATÆGI*. Becoming quite a rare butterfly, and quite gone from many places where it once was met with in abundance.

3. *ARGYNNIS AGLAIA*. Not nearly so common as of old. I have not seen it in this district for more than twenty years, though it occurred formerly in Castle Eden Dene, and most of the woods and denes in the county.

4. *VANESSA C-ALBUM*. Mr. Stainton remarked thirty years ago that this species had disappeared from many of its former haunts. I have seen it so abundant here that half-a-dozen might be taken in the net at one stroke. It has not been seen for fully twenty years. In the hop counties it still seems to retain its hold, though generally scarce.

5. *VANESSA IO*. When I commenced to collect, the larvæ might be found on every patch of nettles. I have not seen them for many years, and rarely observe the perfect insect. The same remark applies to many other places.

6. *SATYRUS ÆGERIA*. Has disappeared from many large districts, and is far from being "generally distributed" now. It is in the old lists for this county, but I have never seen or heard of it in my thirty year's collecting.

7. *SATYRUS MEGÆRA*. The same remark applies to this species. When I commenced to collect it was one of the most abundant butterflies here. It disappeared suddenly and we have never seen it since. I believe the disappearance was not confined to this county but was of much wider extent.

8. *SATYRUS HYPERANTHUS*. Disappeared from this neighbourhood at the same time, and has never reappeared to my knowledge.

9. *CHORTOBIUS PAMPHILUS*. Has quite gone from large tracts in the West Riding of Yorkshire, where it was formerly common.

10. *LYCÆNA ALSUS*. Disappearing in many places. It has left this district for many years.

11. *HESPERIA SYLVANUS*. The same remark applies to this also. Only one specimen has been taken in this district during my time, though old records speak of it occurring freely.

I might also add to the list *M. ARTEMIS*, *P. PHLÆAS*, and *L. ARGIOLOUS*, and others if necessary, but these are enough for my argument.

I have now enumerated twenty butterflies, of which one at least is already extinct, several only keeping on our lists by immigration, and a still larger number that, while common where they occur, are disappearing from extensive districts, and not again spreading over them. If this be borne out by the facts, the question naturally arises—How long has it been going on, and

is there any evidence in support of the opinion that our existing butterflies are fewer in number than they once were? I think there is such evidence.

In the first place the earlier writers on Entomology mention a considerable number of species as natives of Britain, that are not now to be found. This has been explained away by supposing some of the records to be mistakes, and others to be captures of accidental visitors. But there seems no more reason for doubting the authenticity of some of them, than of disputing the actual occurrence of the Large Copper five and twenty years ago. Many of them were species that ought to have been found here, the British Isles being fairly within their range.

Secondly, I do not find that anything like the same proportion of species in other groups are becoming rare or extinct. A few species may have done so, but none that were even generally abundant, and in every group the new additions to our fauna has far exceeded those that have disappeared or become rare. It is true that our desire to increase our collections, to add more species to those existing, had led to the inclusion in our lists of species of which but a chance specimen had been taken, and whose native haunts were far from our shores. Thus, *S. Phœgea* and *N. Ancilla* are found in our exchange lists, to the bewilderment of beginners, and the advantage of no one but the dealers who supply Foreign types. Species included in this way are soon dropped out again, but what I say above is not intended to apply to these chance visitors at all.

I tried to find some country resembling Britain in natural conditions and extent that I might in the third place compare the butterflies found there with those that are natives here. This I failed to do, and had there been such a place it is a chance if I could have obtained the requisite data for instituting a comparison. I have therefore taken for this purpose the Lepidopterous Fauna of the whole of the Palæarctic Region, which is defined by Wallace as follows: "This very extensive region comprises all Temperate Europe and Asia, from Iceland to Behring Straits, and from the Azores to Japan. The Southern boundary is somewhat indefinite, but it seems advisable to comprise in it all the extra-tropical part of the Sahara and Arabia, and all Persia, Cabul, and Beloochistan to the Indus. It comes down to a little below the limits of forests in the Himalayas, and includes the Northern half of China, not quite so far down the coast as Amoy." Professor Wallace has arrived at his conclusions in defining the various region from an examination of the Vertebrata inhabiting them. "The Palæarctic region," he says, "is well characterized by possessing 3 families of vertebrates peculiar to it, as well as 35 peculiar genera of mammalia, and 57 of birds, constituting about one-third of the total number it possesses. These are amply sufficient to char-

acterize a region positively, but we must also consider the absence of many important groups of the Oriental, Ethiopian and Arctic region; and we shall then find, that taking positive and negative characters together, and making some allowance for the necessary poverty of a temperate as compared, with a tropical region, the Palæarctic is almost as strongly marked and well defined as any other."

Dr. Staudinger has prepared a list of the Lepidoptera inhabiting "the territory of the European Fauna," and it is an evidence of the correctness of the conclusions of Wallace, that from entirely different data, Dr. Staudinger has defined so nearly the same area, that for all practical purposes it may be considered identical. Dr. Staudinger first takes the Lepidoptera of Europe proper—Geographical Europe. Then wherever he finds the Lepidoptera occurring in Europe to be at least 60 per cent of the whole, he includes the locality where such proportion obtains, as one inhabited by the Fauna of Europe. I need not point out the trifling differences between the two areas, and have only referred to both, that it may be seen, it is a well defined Zoological region, and that any argument based upon its Fauna is a fair one.

From Dr. Staudinger's catalogue, and the lists of British species, I have prepared the following table, which I think will be easily understood.—

			Palæarctic Species.			British Species.		Proportion.
Butterflies	...	...	456	...	...	64	...	about 1 in 7
Burnets	...	...	75	...	...	9	...	„ 1 in 8
Hawks	...	...	110	...	...	33	...	„ 1 in 3½
Bombyces	...	...	369	...	...	105	...	„ 1 in 3½
Noctuas	...	...	1040	...	...	321	...	„ 1 in 3¼
Geometers	...	...	799	...	...	282	...	„ 1 in 2¾
			<hr/>		<hr/>		<hr/>	
			2393		750		1 in 3¼	

Taking the above table as a whole it is clear that in proportion to the other groups (except the Burnets), either singly or together, we have less than half the number of butterflies that we ought to have. That while of the larger Heterocera, 1 species is found in Britain for every 3¼ found over the whole of this extensive district, we have only 1 butterfly for every 7 found over the same territory. The calculation may be made another way. The number of butterflies and moths occurring in this region is 2849, of which 456 are butterflies, being about ONE-SIXTH of the whole. In Britain the total number found is 814, of which the 64 butterflies are but ONE-THIRTEENTH of the whole. Whichever way, therefore, we compare the numbers, the result shows that less than half of the proportionate number of butterflies occur here.

The causes generally assigned as the reason for the diminution of the number of our butterflies, are our mild open winters, cold and ungenial springs, rainy and sunless summers, and the above table affords another strong evidence that the assumption is correct. It will be observed that I have separated the Burnets (*Zygænidæ* and *Syntomidæ*) from the Hawks. I did this because these insects are of such butterfly-like habits, that they may fairly be compared together. Like the Butterflies they are true day-flyers, delighting in the hottest sun, and remaining on cold sunless days, torpid and motionless. Of the 75 Palæarctic species only 9 occur with us, even a smaller proportion than of the butterflies, being less than 1 in 8. It is evident then that the same cause has affected them both, for they have both suffered in the same proportion, and from both having a diurnal flight, and remaining inactive except in the sunshine, our sunless summers have no doubt had a powerful influence in diminishing their numbers. The mild winter prevents early hybernation, or rouses the young larva from its repose earlier than it ought, and the cold, wet spring kills them off before they approach maturity. Unless our climate changes, and it is not likely to do so in any perceptible degree, we may expect the British butterflies to become fewer and fewer in number, and perhaps eventually to disappear altogether.

This is not the place to discuss meteorological phenomena, but I may at all events suggest that the destruction of our forests has been one main cause of the change that has been so disastrous for the Butterfly collector.

THE HERRING.

By J. OSBORNE.

LIVING all my life in a fishing village, I have naturally become interested in what interested my neighbours, and have picked up an item or two in Natural History among them. They depend very greatly on the Herring fishery, and whenever they have poor success in line fishing, they rely on making it up when the herring season comes round. A good herring season means plenty and comfort, and a bad one means poverty and starvation in many a home. The numbers of this fish that are taken in one season are so enormous, that when put into figures, they seem almost fabulous; and the fecundity of the insect race is not to be compared with that of many of the finny tribe. The Herring has, therefore, become a matter of national importance, and notwithstanding its disappearance, or comparative disappearance from many of its old haunts, it is only of recent years that any attempt has been made to understand its life history. The old theory was that the Her-

ring was a migratory fish, living in the Polar Seas, and making periodical visits to our shores for the purpose of spawning. Few popular errors seemed to have a better foundation than this. The shoals appear first at the north of Scotland, where they may be found at the end of June or July. By August the fish is off the Durham or Yorkshire coast. In September it may be taken at Yarmouth, and so on until it apparently reaches the Devon and Cornish Coasts by November. The shoals then appear to turn northward again, heading to the Polar Seas; for some time after Christmas, and even as late as March, they are spawning on the west of Scotland. All this theory about migration has been shown to be utterly unfounded, and the Herring is now known to be a local fish, abiding all the year round in its own station, and said only to congregate in shoals once a year at spawning time. The North Sea cannot be considered very deep in comparison with others, and is full of banks of sand, some of very great extent, where the water is not more than 40 or 50 fathoms (240 to 300 feet) deep. The best known of these banks is the Dogger, "where sailors go to fish for Cod." Between them the water is very much deeper, but the Herring makes its home in the shallower water upon the banks, and never frequents the deeper channels between. Herring curers profess to know by the appearance of the fish from what neighbourhood they have been taken, some of the more experienced claiming to know within a very few miles. If this be so, "local races" are evidently not confined to Lepidoptera, and it is a very strong proof indeed that the Herring does not migrate at all.

The Herring ripens to spawn when the water is at a temperature of 50 to 55 degrees, and it is this fact that has led to the appearance of the shoals in such regular succession down the coast, and to the general belief in its migration. The water is at the proper temperature first at the north-east of Scotland, and there they first appear, and as it reaches the needed degrees elsewhere they make their appearance and are taken by millions. On the southern coast it is late in the year before the water has sufficiently cooled, while the impinging of the Gulf Stream on our western shores, makes it still later before they are ready to spawn there. For spawning they prefer a rocky bottom, overgrown with weeds, and have been observed rubbing themselves against the stones to force out the spawn. The spawn soon hatches, and many if not all of the young herring make their way to the shallow waters of our shores, entering docks and harbours, and even making some progress up many of the tidal rivers. In this state they are called "garvies" in Scotland, and "sprats" on the English coast. The "sprat" or "herring sprat" was believed to be a different fish from the Herring, and is still annually taken in large quantities, to be eaten fresh or smoked and dried. No wonder that the Herring

is not so abundant in some of its haunts as formerly, when such an incessant war is waged upon it. I have a memorandum of one day when seven boats landed here, each with 10 "last" of herrings or more. A "last" is considered to be 10,000, but as six score (120) is given to 100, a "last" is really 12,000 fish, and these seven boats must have had over a million fish in them. There were forty to fifty other boats with fish the same day, whose takes varied from a hundred to several last. I have a note also that in the year 1859 no less than 4,514 lasts of Herring were taken at Boulogne, in France. In the same year 278,000,000 of bloaters, and 50,000,000 of red herrings were received at Billingsgate Fish Market. I have seen "sprats" so abundant that a large dishful was sold for a penny, and at other times have known them carted away for manure. In easterly gales they are frequently driven ashore in large numbers, and high water mark for miles will be heaped with them. I have sometimes found a few among the rock pools at very low water, but I could never get them home alive. In these pools they swim near the surface if not disturbed, but if any one approaches them they dart off together to the middle of the pool, and swim nearer the bottom. The little shoals will not readily separate, but keep together in spite of all efforts to separate them.

The term "sprat" is not applied to the very young fish. When three inches long or less they are called Herring "Sile," an evident corruption of the Scandinavian name *Sill* or *Sild*. The Latin *Alec* or *Halic* could not specially apply to the Herring, for it is unknown in the Mediterranean, but *Alec* was a name for any small marine fish, and is used for Herring in Doomsday Book, where Dunwich was taxed to the extent of "*Sexaginta millia Alectum*,"—60,000 herrings. Many suggestions have been offered as to the derivation of the modern name Herring, but there can be little doubt it was derived from the Anglo-Saxon *Hæring*, which is scarcely modified in the name of the present day.

The earliest reference to the Herring that I have met with occurs in a Charter granted by the Bishop of London, Bishop Erkenwald, about the year 680, to the Monastery of Barking. Allusion is made in it to the salting and even the smoking of Herrings, and those levied for the use of the Monks at Easter are called "Silver Herring." Some twenty years later Bishop Edwin founded a Monastery at Evesham in Worcestershire, and the Herring is referred to in the rules for its management. Edward the Confessor gave a saltmine in Cheshire to the Abbey of Fecamp, so that the Monks might be able to cure their own Herring. These all show how important an article of food it was even in these early days, and how the same modes of curing, salting and smoking, that we use now, were adopted then. The first

allusion to "Red Herring" that I have heard of is in the reign of Henry III, but it is clear that they were smoked several centuries before, by whatever name they were called. At the time of the conquest, Salt Pans existed all along the coast, wherever there were Herring fisheries. Even at this date Yarmouth was the great rendezvous for Herring fishers, and both Flemish and French boats, as well as English and Scotch, used to congregate there. There was even a close season fixed then, as if the lawgivers of that date understood better than those of more modern times how to keep the fishing good. It was of course regulated by Saint's Days, and between the feast of St. Martin (4th July), and the feast of St. Michael (29th September) no fishing was allowed on the Norfolk coast. Whether this close season extended elsewhere I have not been able to learn. In 1128, Henry I. appointed a Mayor of Yarmouth, who had to pay to the king a royalty of 10,000 Herrings annually. Dunwich, which was then an important walled town, was more heavily taxed, for it had to render annually 12,000 Herrings to the Monks of Ely, and an equal number to the Monks of Eye. Owing to the rapid encroachments of the sea, Dunwich fell into decay, and in consideration thereof King John remitted both these imposts. The same Monarch granted a Charter to Yarmouth, one of the conditions of which was that the town should send through the Sheriff of Norwich, twenty-four herring pies annually. I have mentioned the reference to Red Herrings in the Reign of Henry III. In the next reign (Edward I.) they were sold at the rate of twenty for a penny. Edward II. wrote letters in his own hand to Haco VI. of Norway, complaining that certain English merchants trading to Norway with Herrings had been arrested and imprisoned, and demanded redress. Thus year by year the various enactments, or other dealings with the Herring might be traced, but it is unnecessary.

We have yet a great deal to learn about this fish, especially as to its habits between the spawning seasons. It is generally supposed that it does not congregate in these vast shoals except at spawning time, but the habits of the "Sile" and "Sprat" of keeping together in large numbers, seems to be evidence of their being gregarious all their lives. In places that have been over-fished, and especially where the young have been largely destroyed, the fish for many years afterwards are few in number, and scarcely worth the cost of capture, but were the young in all cases allowed to mature, there scarcely seems any possibility of seriously diminishing the numbers of the full-grown fish. Very little too is known about its food. It is never taken with bait, but only by nets which are hung down near the surface of the water, and entangle the fish as it swims. It probably feeds on the smaller crustacea and other minute creatures that abound everywhere, but it evidently

has the power of assimilating its food very rapidly, for it has, compared with other fish, a very small stomach.

I would like to imitate Mr. Soutter by finishing this paper with a selection of poetical quotations, beginning with Falstaff's allusion to "a Shotten Herring," but I forbear, as it is already long enough.

LEPIDOPTERA OBSERVED IN THE NEIGHBOURHOOD OF OLDHAM, IN 1884.

By J. T. RODGERS.

n numerous, *s* scarce, *v* very, *c* common, *su* sugar.

DIURNI.

<i>P. brassicæ</i> , vn	<i>P. napi</i> , c	<i>V. atalanta</i> , a few
<i>P. rapæ</i> , c	<i>V. Io</i> , a few	<i>V. cardui</i> , a few

NOCTURNI.

<i>H. lupulinus</i> , a few	<i>H. humuli</i> , vn	<i>A. menthastri</i> , c
<i>H. velleda</i> , vn	<i>A. lubricipeda</i> , c	

GEOMETÆ.

<i>R. cratægata</i> , a few	<i>C. brunata</i> , at lamps	<i>M. fluctuata</i> , c
<i>H. progemmaria</i> , a few	<i>L. didymata</i> , c, at ragwort	

NOCTUÆ.

<i>A. psi</i> , a few, su.	<i>M. fasciuncula</i> , few su	<i>T. pronuba</i> , vn su
<i>H. rurea</i> , n, su	<i>M. literosa</i> , few, su	<i>N. plecta</i> , 2 at su
<i>H. polyodon</i> , n, su	<i>M. furuncula</i> , few su	<i>N. augur</i> , 3 at su
<i>M. brassicæ</i> , n, su	<i>M. arcuosa</i> , vn, at <i>Aira</i>	<i>H. pisi</i> , few, su
<i>A. basilinea</i> , n, su	<i>cæspitosa</i>	<i>P. iota</i> , 1 at rest
<i>O. oclea</i> , 3 at su	<i>C. cubicularis</i> , c, su.	<i>M. typica</i> , n, su
<i>M. strigilis</i> , few su		

I sugared at intervals throughout the season, but on many nights Lepidoptera were very scarce, and I had to return home with empty boxes. I was very much surprised to see that Coleoptera were common on those nights when Lepidoptera were absent, especially *Carabus nemoralis* and *Nebria Gyllenhalli*.

PEZOMACHUS ZONATUS.

By G. C. BIGNELL.

"IN beating for larvæ last August, I knocked the enclosed insect into my beating tray, but as I do not remember seeing any ants with black bands on

the abdomen before, I now enclose it trusting you will be able to name it for me.—J. ROSEWEAR.”

The enclosed insect is *Pezomachus zonatus*, I am not surprised at its being taken for an ant. All the female *Pezomachi* are very ant-like, but can at once be recognised by the ovipositor protruding beyond the last abdominal segment; shape of the head, antennæ, &c. The male *Pezomachi* are nearly all winged, and most of them, when bred, I have no doubt, will be placed in the genus *Hemiteles*, for in that genus there are many males without partners, and in the genus *Pezomachus* there are many females in the same predicament, from these remarks it will be seen that unless the males and females are bred from the same host, it is impossible to assign them to their proper partners, from their difference of structure and often of colour, and this we cannot hope to do until the breeders of lepidoptera and other orders, will assist in the work, by sending all their bred specimens to the workers of this order.*

I must plead guilty of neglecting for twenty years, to save my bred ichneumons, but during the greater part of that time I believe no one worked at them, or I certainly should have sent them to the individual; it is only by co-operation that we shall be able to solve many of the problems among the ichneumons, and I may here remark that cocoons, large or small, sent to workers of this order, will be doubly acceptable, when they are from a known host. I am sorry to say these little fellows get so awfully rigid after death that they soon become useless, and unless they are well set it is an impossibility to name them, therefore, I earnestly hope that those who do find ichneumon cocoons in their breeding cages will send them forthwith to the individual who is to be favoured.

With respect to *Pezomachus zonatus*, I have bred both male and female from spiders nests, *Agelena brunnea*; these nests are made on stems of grass, heath, and I suppose many other things. The nest is very curious; it is fastened to the side of the selected object, and when finished is covered with particles of mud, of whatever colour is most prominent on the road, so that it shall resemble a splash of mud. To make it more explicit, I have seen them of three colours within a mile, first they were black from the road, being composed, or rather covered, with peat or bog-earth; turning out of this road there was a cutting through red soil, there they were red; not far from this the wagons laden with china clay pass all the year round, consequently the road is white from portions of clay falling off daily, there they were white.

*Mr. Bridgman, 69, St. Giles Street, Norwich; Mr. Bignell, Stonehaven, Plymouth; Mr. Fitch, Maldon, Essex.—J. E. R.

OUR LONDON LETTER.

FEBRUARY 20TH, 1885.

THE entomological season may now be said to have fairly commenced in this district. On February 7th *H. Leucophearia* was to be met with sparingly in Richmond Park, and a week later it was in abundance, dark forms being readily obtained by a little diligent working. A solitary specimen of *N. Hispidaria* was also recorded, and sundry *P. pilosaria* and *T. hyemana*. *L. Multistrigaria* has been appearing freely in breeding cages kept exposed to the weather, and doubtless will be plentiful at Wanstead, Loughton, Hampstead and elsewhere when this is published, and a little bright weather sends the usual detachment of "long rods" down to West Wickham Woods after *Brephos Parthenias*.

The Ecclesiastical Commissioners have just presented the public with Gravel-pit Wood, Highgate. The Highgate Woods have long been favourite working grounds for entomologists in the North of London, and as it appeared they would be destroyed and built upon, the action of the Commissioners in leaving what is known as the "Fimbria Wood" will be widely appreciated. Mr. J. A. Cooper has bred a specimen of *E. Versicolor* and four specimens of *P. Nubeculosa* which had remained in the pupa state for two years.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—This Society has just issued a report for the year 1884; it contains the President's opening address, a list of the members, catalogue of the library, etc., etc. We are glad to see that the society is in a flourishing condition, and congratulate them upon their progress.

NOTES AND OBSERVATIONS.

HYBERNIA DEFOLIARIA.—On Monday last, February 9th, 1885, in passing through a wood near here, I was surprised to see a male *Defoliaria* sitting on a tree, evidently just emerged, its wings not being properly dry, and then on Wednesday the 11th I had a female *defoliaria* brought to me from the same place. Is it not rather unusual for this moth to be found in February? Perhaps some of your correspondents who reside where it occurs abundantly may be able to enlighten us on the matter, as it only occurs very sparingly here. In looking over my notes I find I have met with it in October, November, December (December 25th, 1884, being my latest capture until this year), January and February, this is five months out of the twelve, rather a long time for an insect to be flying.—JOHN HILL, Little Eaton, near Derby.

HYBERNATING DIURNI.—When riding in Caversham Warren, near Reading, on the Oxfordshire side of the Thames, I noticed two Brimstones (*G. rhamni*), and a Peacock (*V. Io*) on February 11th, an evidence of the mildness of the season.—C. E. HENDERSON, Reading.

WILD RABBIT AND POULTRY.—Some years ago I possessed a wild rabbit, which I found on a road near Linton, in Devonshire, when about three weeks old. It was brought up upon milk, which it sucked through a quill with the finger of an old kid glove attached to it. When about half-grown this rabbit was turned into a yard with some poultry, and was a good deal bullied by the cocks. At length a bright idea of revenging himself occurred to the bunny. Watching his opportunity, when one of his assailants was pecking or standing in a listless attitude, he would charge from behind, with his head down, and almost always succeed in upsetting his enemy, generally sending him head over heels. After he had asserted his authority in the poultry yard, he became quite friendly with the poultry and always slept in the hen-house. At a later period of this bunny's lifetime, he lived in loose box with another tame buck rabbit, whom he bullied unmercifully, till at last gnawing through two inches of oak he made his escape.—R. J. ATTYE, Stratford-on-Avon

GLASGOW PRACTICAL NATURALISTS' SOCIETY.—Allow me to correct one or two inaccuracies in the report of Mr. McKay of the meeting of the above Society, which appeared in the February part of the *Young Naturalist*. The specimen of the Night Heron exhibited was not an adult but a young female in immature plumage. Neither had it been shot; it was caught alive in an exhausted condition and lived a few days after its capture. The name by which it was exhibited (*Nycticorax Griseus*, L.) is a better one than *Nycticorax Gardeni*, a synonymn, which is not used by our most recent ornithological authorities. I may in conclusion remark that the bird was not exhibited by me, but by my colleague in the museum, Mr. James Connell. My only reason for thus troubling you with the above corrections is that I think all reports bearing on the occurrence of rare species ought to be perfectly accurate.—J. W. CAMPBELL.

OBITUARY.

We have just learned with great regret that Mr. E. C. Rye died on the 7th February, from Small Pox. Mr. Rye is best known as a Coleopterist, in which order he was a constant contributor to the magazines. His largest work is "British Beetles, an Introduction to the Study of our Indigenous Coleoptera," published by Lovell, Reeve, & Co. His collection of Beetles is in the possession of Dr. Mason, Burton-on-Trent.

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A FEW NOTES ON THE NATURAL HISTORY OF THE PEMBROKESHIRE COAST.

Read before the Lancashire and Cheshire Entomological Society.

By CHARLES G. BARRETT.

FOR the purposes of study, collecting, and excursions, the Pembroke Field Club found it convenient to adopt a natural rather than an artificial boundary, which was found in a little river—the Taf or Tave—which running for many miles close to the border of the counties of Pembroke and Carmarthen, bends eastward at Laugharne, and so enables the Pembroke naturalists to include in their district an extensive range of sands and sand-hills—dunes, denes, marrams, or warrens—extending for about five miles to Pendine. These sandhills are not very prolific in insects, but *Cicindela maritima* has been found upon them and also *Agrotis præcox*. They are rendered much more interesting to the botanist, by the presence in great abundance of the beautiful hearts-ease (*Viola Curtisii*); and early in the summer the swamps contain immense beds of *Menyanthes trifoliata*. A small variety of *Helix pisana* is common on the sand hills, but the chief attraction of this piece of coast is in the extraordinary abundance of marine shells to be found on the sands after every favourable tide. The species are not numerous, being all sand-frequenting forms, but the abundance is so great that acres of sand about the highest spring-tide mark are covered with dead valves of *Lutraria elliptica*, *Cardium edule*, *Buccinum undatum*, and *Tellina solidula*, while the highest point of the last tide is sometimes indicated by a broad band, like a waggon track, ten or twelve feet wide, consisting of these species with *Solen marginatus* and *siliqua*, *Thraci papyracea*, *Cardium echinatum*, *Tellina tenuis* and *fabula*, *Natica monilifera*, myriads of *Ceratisolen legumen* and *Mactra stultorum*, with its variety *cinerea*, and here and there specimens of *Actæon tornatilis*, and *Lucinopsis undata*, or immense worn valves of *Cyprina Islandica* var. *crassior*. Here also, but now very rarely, may be found the lovely *Scalaria Turtonæ*.

At Pendine the sands are interrupted by a bold promontory of limestone rock, and for some miles the coast continues very bold, until another broad stretch of sands is reached at Amroth. The view from the hills across Amroth, Tenby and to the cliffs further west is one of the finest in the county. At Amroth, but only accessible at low spring tides, there are beds of blue clay, containing multitudes of valves of *Scrobicularia piperata* of unusual size, and also beds of ancient peat, in which *Pholas candida* still lives in multitudes, and from which *Pholas dactylus* is hardly yet exterminated. Higher up in rocks of shale, dead valves of this species and *Pholas parva* may still be found in the holes in which they lived, and also from some unexplained cause, all died. Beyond Amroth the cliffs are again very bold and rugged, but soon become softened off into slopes, terraces and loose undercliffs from the weathering away of a friable clay-slate, over-lying beds of hard coal, or culm, which here reaches the sea. Here *Silene maritima* grows in great profusion, and is attended by *Dianthecia capsophila* and *conspersa*, as well as by *Gelechia leucomelanella*. *Solidago virgaurea* is also plentiful, affording sustenance to *Ennychia octomaculalis*, *Aciptilia osteodactyla*, *Catoptria æmulana*, and *Eupæcilia curvistrigana*, and possibly also to *Botys terrealis*, which if present is very rare. *B. asinalis* is present, wherever its food plant, the wild madder (*Rubia peregrina*) grows, and very rarely *Bryophila glandifera* may be found sitting on a rock.

Beyond is another sandy bay with the charming village of Saundersfoot, a favourite resort of visitors. On some loose sands *Euphorbia paralias* and *Raphanus maritima* are common, and *Helix pisana* is again to be found. On the rocks between tide marks a curious imbricated variety of *Purpura lapillus* is common, with various banded forms of the same shell, and after favourable winds the sands are thickly strewn with *Tellina tenuis*, *fabula* and *solidula*, *Donax anatinus*, *Lucinopsis undata*, *Mactra subtruncata*, and *stultorum*, with its variety. Occasionally *Actæon tornatilis* will also drift in in plenty, with *Philine aperta*, and *Venus gallina* raises a little heap of sand to make itself conspicuous. After passing Saundersfoot the cliffs become broken into promontories and small bays, sometimes rocky and precipitous, in one case—the Monkstone—throwing out a mass of rocks into the bay; elsewhere with steep slopes and undercliffs covered with stunted bushes or crowned with woods. In this neighbourhood *Polia nigrocincta* has been captured, as well as *Triphæna subsequa*, *Noctua neglecta*, and *Agrotis agathina* with *Aplecta herbida*, *Hadena adusta*, and *contigua*, and other species not usually associated with a wild and stormy sea coast. One of the precipices in this section of the coast was the scene of a shocking tragedy a year or two ago. A pair of ravens usually build here, undeterred by the

fact that their nest is annually robbed. On the occasion in question, after the first clutch of eggs had been taken and sold, the birds recommenced nidification, and a visitor at Tenby engaged the men to obtain the eggs for him. The only means of reaching the nest is of course by suspending a man part way down the precipice, and on this occasion, part of the payment being unfortunately advanced, the men became so far intoxicated as to fasten the rope insecurely, so that it gave way and the poor wretch was dashed in pieces.

Tenby is by far the most thoroughly worked up, though by no means the richest, portion of the Pembrokeshire coast, and I have nothing new to say about it. The cliffs along the front of the town are bright in the spring with the blossoms of the wild cabbage, above the rocky slopes *Lathyrus maritima* may occasionally be found, and also the very local moth *Lithosia caniola*. Other slopes are completely covered with the large leaves of the introduced plant *Petasites fragrans*, or perfumed in mid-winter by its flowers. The samphire (*Crithmum maritimum*) fringes the chinks of the limestone rocks, and the pretty *Spergularia rubra* hangs from the smaller cracks right up to walls of the museum. These rocks are also frequented by a very local little moth, *Gelechia ocellatella* (a species quite different from *instabilella* and *plantaginella*), which feeds on leaves and shoots of *Beta maritima*. All over these rocky places *Helix pisana* is abundant, of large size and very variable, and it extends to the sandhills beyond the town. In other respects these sandhills are singularly devoid of interest. Of the moths and beetles, usually so plentiful in such places, hardly a specimen is to be found. I once found a specimen of *Nebria complanata*, when opening tufts of *Ammophila*, in search of moths; and on another occasion met with the local and very minute *Elachista collitella*, skipping about the grass blades, but this species was not again seen. In the level, wind-blown spaces between the sandhills, *Euphorbia paralias* is found, and in the adjacent marsh plenty of *Myrica gale*, *Amenanthes trifoliata*, and a great profusion of sedges. *Sparganium simplex* is in the ditches, and *Lastræa thelypteris* not quite exterminated in the wettest places. Here also are moths of very local distribution, such as *Nonagria despecta* and *Peronea comariana*, and absurd as it may seem, this is the only locality in Pembrokeshire in which I have found *Cataclysta lemnalis*. *Ancylus lacustris* occurs in some of the ditches, and the abundance of *Limnæa palustris* and *Physa hypnorum* that may be seen moving about in the water on a bright spring day is something extraordinary.

Parallel with, but outside, this marsh and range of sandhills, is the famous "shell beach," of which the glory has, I fear, departed. The action of the tide appears to be silting up that part of the bay with sand, so much so that

the shell-beds appear to be getting buried. During a violent eastern gale great numbers of *Mya truncata*, *Modiola modiolus*, and *radiata*, with a few *M. barbata* and other species are still thrown up, and the common *Tapes pullastra* occurs in wonderful variety of colour and marking; while portions of the sands are at times covered with myriads of dead *Cerithium reticulatum*, among which may be found *Pleurotoma nebula*, and rarely *P. attenuata*, also *Philine aperta*, and numerous valves of *Axinus flexuosus*, but many of the species for which this beach was formerly renowned have become rare or have disappeared.

I must hurry on past Lydstep, where *Thalictum minus*, *Aquilegia vulgaris* (in great variety), *Honkenya peploides*, *Orchis pyramidalis*, and *Cynoglossum officinale* are abundant, and *Harpalyce rivata* occurs, Manorbier and Freshwater East, where the old red sandstone crops out in the cliffs, and a very pretty white banded variety of *Littorina rudis* is found on the rocks, past Stackpole Head and Broad Haven, where the same shell takes all manner of banded forms of red, purplish, black and white, to the wonderful range of cliffs, which commencing at Bosherston Mere and St. Govin's Chapel, extends to Linney Head, where the Atlantic waves throw their spray high over the top of the hill. This range is, I think, entirely limestone, contorted and tilted in every direction, hollowed out into deep inlets, as at the Huntsman's Leap, or undermined in extensive caves, or else forming curious arches, terraces and pillars, among which the waves incessantly come and go. In one place the sea has found its way up through the roof of a cave to the surface, and at certain states of wind and tide, rushes up the narrow shaft with a roar that is heard for more than a mile. In another the surface has sunk down perhaps a hundred feet, in the form of an inverted cone, and ash trees have appeared, self-sown, and so filled the surface with their tangled branches and twigs as to give the appearance from a few yards distance of a dense mass of bushes. In yet another wild spot, near the "Stack Rocks," a vast circular hole called the "Cauldron," surrounded by perpendicular rocks and communicating with the sea by a noble archway, forms a scene of unusual grandeur, not lessened by the wild cries of the sea birds, as they circle round within it or fly out to sea through the archway. This portion of the coast is populous in the summer with sea birds. The Guillemot and Razorbill rear their young in multitudes on the surface and more sloping sides of the three isolated "Stack" rocks, and on the shelves of the neighbouring cliffs and caves. The Kittiwake in hundreds nests in the chinks of the perpendicular sides of the same rocks; and the Herring Gull may be found, more sparingly, occupying suitable corners in the cliffs for miles. The Jackdaw is plentiful, of course, nesting

in holes; and in one or two safe and secluded spots the Chough and the Peregrine Falcon still rear their young.

The "Stack" rocks, which, though within a stone's-throw of the cliff, are barely accessible, possess another source of interest from the great masses of Tree mallow, *Lavatera arborea*, growing upon them, and visibly blossoming most abundantly, although the plant has almost totally deserted the accessible cliffs. This is more remarkable as it is growing in plenty in cottage gardens all over the country and seeds abundantly, so that no temptation has existed to gather it in dangerous places. Other interesting plants are still to be found among the rocks, such as *Helianthemum canum*, *Inula crithmoides* and *Asplenium marinum*, which last flourishes most luxuriantly in deep fissures, which communicate with the sea two hundred feet below. *Silene maritima* is also common on the rocks, and of course the pretty *Armeria vulgaris*, with its usual attendants in such places—*Sesia philanthiformis* and *Sericoris littorana*. The short turf on the top is abundantly garnished in the spring with the pretty blue flowers of *Scylla verna*, and sometimes enlivened in an extraordinary manner by myriads of *Herbula cespitalis*. The allied *Ennychia cingulalis* is also common, but much given to frequenting the brink of a precipice, where its capture is not unattended with danger.

From Linney Head the shore tends inward, forming a sandy bay some miles in extent, backed by extensive sand warrens, the home of thousands of rabbits, and the feeding ground of hundreds of sheep. In the deeper valleys of these sandhills *Argynnis aglaia*, *Lycæna Medon* (*Agestis=Astrarche*), and *L. ægon* fly in plenty, here also a fine and beautiful specimen of *Laphygma exigua* condescended, one sunny day last September, to fly up, and down again almost at my feet. But this is not a rich locality for moths. It hardly seems credible to those acquainted with the similar sandhills of the east, south, and north-west coast, that *Agrotis cursoria* has never been found here, that *A. valligera* and *Leucania littoralis* are very scarce, and *A. tritici* very far from common, and to all appearance nothing, unless *Stenopteryx hybridalis*, take their place. Of plants, *Euphorbia Portlandica* is common here, as along many miles of the coast, and more rarely may be found the handsome yellow horned poppy (*Glaucium luteum*), and the Henbane (*Hyoscyamus niger*). Some of the flat places produce plenty of *Gentiana amarella*, very stunted, and the marshes formed along the rivulets by beds of clay on the slopes, produce *Epipactis palustris* and *Samolus valerandi*. One such spot in the hollow of the sandhills, which is even a pond in wet weather, produced *Hydrocotyle vulgaris* in flower and fruit in great abundance. *Helix pisana* has not reached this locality, and the only interesting land shell is an unicolorous purple variety of *Helix virgata*, but with marine shells it is

far otherwise. Long tongues and ledges of rock run across the bay from the Linney side, and besides forming a protected and highly appreciated feeding ground for the more littoral species, appear also to catch the drift of deep sea species brought along by ocean currents. The result is that the beach under the rocks is covered with a gravel, mainly composed of shells and their fragments. *Murex*, *Littorina*, *Cypræa*, *Nassa* in myriads, mingled more or less frequently with various species of *Scalaria*, *Pleurotoma*, *Defrancia*, *Rissoa*, *Odostomia*, *Trochus*, *Emarginula*, *Fissurella*, *Lacuna*, *Eulima*, *Cerithium*, *Trophon*, *Marginella* and *Cerithiopsis*, all dead of course, and mostly rolled, also abundance of valves of *Nucula*, *Pecten pusio* and *tigrinus*, *Cardium*, *Circe*, *Arca*, and *Venus*. *Ovula patula*, *Trophon barvicensis*, *Defrancia teres* and *Leufroyi* have been found here, and one *Trochus exasperatus*. But among all this extraordinary wealth of species and individuals, living or perfect shells are rarely found. The rocks, however, produce *Tectura virginea* and *Trochus lineatus* living, and sometimes fine specimens of the handsome white variety (*Lyonsii*) of *T. zizyphinus*.

Beyond this bay—Freshwater West—the coast becomes again rocky, and in a few miles reaches the mouth of Milford Haven, a “natural boundary,” which acts greatly to limit investigation in that direction, and which for its own productions can hardly be treated of at the fag end of a paper.

68, Camberwell Grove, London, S.E.

THE ENTOMOLOGICAL YEAR.

By ALERT H. WATERS, B.A.

APRIL.

Bright Spring has come

With genial sunshine and refreshing showers,
The erst-while leafless boughs as if they woke
Anew to life, put forth their tender leaves,
And with their verdant beauty charm our eyes;
Now too, the worms appear, whose mission 'tis
To check the herbal increase, lest the plants,
Which carpet green the earth, should grow too thick,
And crowd and crush each other out.

APRIL they tell us comes from the Latin word *Aperire* to open. With many entomologists this is really the opening one of their season, so that to them the name is very appropriate. Possibly many of those who read these pages—although they may have done a little now and then during the preceding

months—will inaugurate the “Entomological Year” in earnest by a trip on Easter Monday, supposing that day should turn out fine, as is occasionally the case.

The Bank Holiday which will set free many of those whose occupation prevents them giving up much of their time, excepting on such occasions, will fall too early this year for the majority of the lepidoptera enumerated below. The species mentioned last month are more likely, should the day be mild, to be met with. The coleoptera will be the Tiger beetles (*Cicindelidæ*), the Ground beetles (*Carabidæ*), and the species of other families already mentioned. The Lady-birds will be out in numbers on any fine day, and those who desire to make acquaintance with the various species can easily do so. I have not space to do more than merely allude to them now, as I wish to say a few words about the larvæ of the *Cicindelidæ*. I do not know whether my readers have ever made the acquaintance of these curious creatures, doubtless some of them have, but for the benefit of others who may not know much about them, I will briefly describe them. I cannot say they are very pretty; doubtless the insects that fall into their clutches regard them as hideous monsters. Each larvæ is white and of a long cylindrical shape, with six scaly feet. On the back are two strong, fleshy tubercles, like horns. Its head is furnished with two strong jaws, and is covered by a large rounded plate. It makes a cylindrical hole in sand at the mouth of which it takes up its position, supported by the tubercle-like horns. It remains there with its jaws expanded and ready to seize on any unwary insect that may come within reach. When the time for its change comes on, it retreats to the bottom of its burrow, where it turns to a pupa.

To those who have within them a genuine love of nature, an outing on a fine day in April, say towards the end of the month, is very enjoyable. The trees are at that time fast putting on their green mantles, the birds are singing merrily, gaily tinted butterflies flutter in the sunshine, or display their wings as they settle on the ground by the roadside, apparently proud of their beauty. On such days

The orange tipped lady, the finest of belles,

And the brimstone glide gaily through sweet primrose dells.

Most of the butterflies we see are the various species of *Vanessidæ*, which have been hybernating during the winter, but the Common White butterflies (*Pieris rapæ* and *P. brassicæ*) also begin to put in an appearance.

Not only are the butterflies out and about on a mild April day, but the bees are also stirring in considerable numbers. We see them at the pendant sallow catkins, or other nectar bearing spring flowers. If we examine them we shall see that they mostly belong to the *Andrenidæ*, and to the typical

genus of the family. The bees belonging to the genus *Andrena* all make burrows in the earth from six to ten inches in depth, at the bottom of which they construct a small cell of an oval shape. In this chamber the female bee lays up a pellet of pollen, mixed with honey, about the size of a garden pea. This store is of course intended for her own offspring, but more often than not, it is appropriated by some prowling female wasp-bee, who enters the burrow in its owner's absence and deposits her own eggs in the little ball of honey and pollen. Strange to say the bee takes this impudent proceeding with perfect good temper, and deserting the burrow which she has made, and the store of pollen and honey which she has gathered together with so much labour, philosophically goes off and constructs a fresh one.

The burrow is generally straight, but *Andrena rubricata* and *A. fulvescens* construct branch tunnels, each with a cell or chamber at the end. When the bees have deposited their eggs in the store of food provided for the young grubs, they close up the mouth of the burrows.

April will, of course, give the entomologist plenty of occupation at the willow bloom. We gave last month a list of species to be met with both there and at sugar, and it will to a great extent be useful this. As we get on towards May a fresh kind make their appearance. The very scarce Scotch species *Fidonia carbonaria* and *Eupithecia helvetecaria* are among these, together with *E. satyrata*, whose habitat is also Scotland and the north of England; the very rare whitish *irriguata* and greyish *denotata*, the more generally distributed *abbreviata* and *pumilata*; and also *Lobophora lobulata*, *Anticlea derivata*, *Scotosia dubitata*, *Ceropacha ridens*, and at the end of the month *Cucullia verbasci*. We may also meet with the Tortrices: *Phæodes tetraquetana* and *immundana*.

The following is a list of the larvæ to be looked for in April. In order not to occupy too much space next month with repetition, I have marked with an asterisk (*) such species as also feed in May:—

Salix megera. Green, with pale lines. On grass.

Lycæna Alexis. Green, with white spots above the legs. On clover and bird's-foot trefoil.

Syrichthys malvæ. Green, with white lines and brownish head. On wild raspberry (*Rubus Ideus*.)

**Sesia bembeciformis*. Whitish. In wood of willow.

Sesia apiformis. Whitish yellow, with dark brown head. In wood of poplar trees.

Sesia tipuliformis. Whitish, with a pale brown head. In stems of currant bushes.

Hepialus hectus.—Greyish, with yellowish head. On dandelion at night; may be found under moss in the day-time. *H. lupulinus*.—Whitish, with brownish yellow head. Underground on roots of various plants. *H. humuli*.—Rather ochreous, with reddish brown head. Underground, feeding on roots of burdock, nettle, and other plants.

Zeuzera ceculi.—Yellow, with black spots. In wood of apple, elm, and other trees. *Macrogaster arundinis*.—Yellowish, with brown head. In stems of common reed; now very rare.

* *Orgyia gonostigma*.—Black, with orange stripes, and tufts of brownish and blackish hairs. On bramble in Epping Forest, &c.

* *Euthemonia russula*.—Blackish brown, with reddish hairs. On dandelion, plantain, &c. * *Chelonia caja*.—On various plants. * *C. villica*.—

Black, with brown hairs, and reddish head and legs. On various plants.

* *Eulepia cribrum*.—Black. On heather, in the New Forest. * *Bombyx*

trifolii.—Black, with tawny hairs, feeding on clover, &c., near the coast.

B. quercus.—On various plants. * *Odonestis potatoria*.—On grass.

Angerona prunaria.—Brown, twig-like, with bifid protuberances on the 5th, 9th, and 12th segments. On plum, &c. * *Metrocampa margaritata*.—

Dull brownish green, with 12 legs. On birch, beech, hornbeam, and oak.

Ellopiæ fasciaria.—Reddish green, with heart-shaped spots down the back; 10 legs and two rudimentary ones. On fir. * *Pericallia syringaria*.—Some greenish, others brown with a violet tinge; protuberances on the 6th, 7th, and 8th segments, the latter long and slender. On lilac and privet.

* *Crocallis elinguaris*.—Grey brown, marbled with white and violet; twig like, stoutest behind, and with a horse-shoe shaped protuberance on the 12th segment. On sloe and hawthorn. A word of caution must be given to the young entomologist about this caterpillar: do not keep it with others or it will certainly eat them.

* *Cleora lichenaria*.—On lichens. *Boarmia repandata*.—On bramble, sloe,

&c. *B. roboraria*.—On oak. *Gnophos obscurata*.—On grass. Lives con-

cealed by day under stones. *Asthena candidata*, *Acidalia bisetata* and

A. ornata are other Geometrina larvæ feeding now. I have no personal

knowledge of the latter species. *Candidata* feeds on hornbeam, and *bisetata* should be looked after at night on dandelion.

* *Acidalia strigilata* is another rare caterpillar, of which I cannot speak from personal knowledge. Freyer describes it as yellowish grey, with yellowish white spiracular line and dark grey dorsal line. It feeds on hedge woundwort (*Stachys sylvatica*).

Acidalia aversata is common everywhere. On avens (*Geum urbanum*).

* *Aventia flexula* we find in old gardens, on lichens. The pale-green *Larentia*

didymata feeds on primrose and cowslip; the brown *L. olivaria* on bed-straw, the whitish grey *Eupithecia tenuiata* in willow catkins; the dull-green *Thera firmaria* on fir; with brown head and yellow spiracular line. * *M. montanata* feeds on primrose and other plants; the common *Camptogramma bilineata* on grass. *Cidaria russata* on various plants; *C. dotata* on currant, and *Eubolia plumbaria* on clover and heath.

Of the Noctuid larvæ to be looked after now we have the bluish-black *Bryophila perla*, the green *B. glandifera*, and the rare grey-green *B. algæ* (if we could find it), all three feeding on lichens. *Leucania impura* on *carex*, *L. pallens* on grass, and *Senta ulvæ* in reed stems; *Xylophasia rurea*, *X. polyodon*, and *X. hepatica*, living underground in the day-time. *Cerigo cytherea*, feeding on grass growing on dry and stony hills; * *Mamestra furva* on *Aira canescens*; *Apamea gemina*, *A. unanimes*, and * *A. oculatea*, on grass; *A. fibrosa*, in the flower stems of *Iris pseudacorus*; *Miana strigilis* in stems of grasses; *Grammesia trilinea*, on plantain; *Caradrina morphens*, on teasle; *C. alsines*, on chickweed, plantain, &c. *C. blanda*, on low plants; *C. cubicularis*, on chickweed; *Agrotis velligera*, * *A. segetum*, and * *A. exclamationis*, at roots of grasses, *A. cinerea* at roots of low plants, *A. pyrophila* do. and grasses; *Tryphæna ianthina* and *T. fimbria* on primroses; *T. interjecta*, *T. subsequa*, *T. orbona*, *T. pronuba*, *Noctua augur*, *N. plecta*, *N. c-nigrum*, *N. triangulum*, * *N. brunnea*, * *N. festiva*, *N. Dahlii*, *N. umbrosa* and *N. baja* on various low plants at night, living concealed during the day. *N. xanthographa* on grass, and the dark grey-purplish *Aplecta herbida*, together with * *A. occulta*, * *A. nebulosa*, * *A. tincta*, *Plusia iota*, *P. gamma*, *Mania typica*, and *Mania maura* are other Noctuid larvæ occurring in April.

Herminia nemoralis is also one of the spring-feeding caterpillars. It is variegated with dull green and black, and has a row of triangular marks down the back, and oblique streaks down the sides. It feeds on the alternate-leaved golden saxifrage.

This is the month to collect the curious larvæ of the *Hydrocampidæ*, so much resembling caddis worms in their mode of life. *Cataclysta lemnalis*, *Paraponyx stratiotalis* and *Hydrocampa nymphæalis* are all entirely aquatic.

* *Cataclysta lemnalis* is olive-brown, with white head. It lives in a case of silk and leaves, and feeds on duckweed.

Paraponyx stratiotalis is green, with brown head. It is thoroughly aquatic, and feeds on water starwort (*Callitriche*), water ulve (*Stratiotes*), &c.

Hydrocampa nymphæalis is yellowish-white, with a brown head. It lives in a case on water lilies and *Potamogeton*.

I regret I have not space to enumerate the larvæ of the Tortricina and Tineina to be found in April.

Cambridge.

THE HAZEL.

(Corylus avellana.)

By J. P. SOUTTER.

IN the depth of winter when the gelid earth is hard as iron, and the merry rivulets of summer are silent in the embrace of the stern frost king, when the shivering trees stand bare and leafless in the angry blast, gaunt skeletons of their former majesty, testing our faith in the revivifying power of Nature. But yet—

“The close buds
That lie along the boughs, instinct with life,
Patient, awaiting the soft breath of spring,”

will awake responsive to its benign influences.

“And then the fiery sap, the touch from God
Careering through the tree, dilates the bark
And roughs with scale and knob, before it strikes
The summer foliage out in a green flame.”

At this untoward season, and in the midst of such inclement surroundings, the hardy hazel may be seen displaying its blossoms to the keen and nipping air.

“Startling the loiterer in the naked groves
With unexpected beauty, for the time
Of blossoms and green leaves is yet afar.”

At this period the hazel is very ornamental with its numerous clusters of long, slender, pendulous yellow catkins, and its bright rosy pink stigmas peeping out from the encircling scales in which they are snugly enfolded. But it requires an enthusiastic love of nature to tempt the city denizen to the woods at this ungenial season, and to such the hazel is most familiar in autumn, when covered with its umbrageous foliage, and laden with its husky fruit, the gathering of which, in the sunny days of the waning year, form the chief charm of many an autumn holiday.

“Ye swains, now hasten to the hazel bank,
Where, down yon dale, the wildly winding brook
Falls hoarse from steep to steep. In close array
Fit for the thickets and the tangling shrub.
Ye virgins, come. For you their latest song
The woodlands raise; the clustering nuts for you
The lover finds amid the secret shade;
And where they burnish on the topmost bough,
With active vigour crushes down the tree,
Or shakes them ripe from the resigning husk.”

The hazel belongs to the Natural Order, *Cupuliferae*, so named from the cup-like involucre in which the fruit is enclosed. It is the *Amentiferae* of

some authors, so called from the *Amentum* or catkin in which the staminate flowers are produced. This order includes the oak, beech, chesnut, &c. The hazel is called a *Monœcious* plant, because the stamens and pistils are not together as in ordinary blossoms, but are borne on different portions of the young twigs. The flowers of the hazel are curious studies, both from their structure and the long time they require for their full developement. In autumn, when the leaves begin to drop off and leave the branches naked and bare, at the extremities of the slender twigs may be noted numerous clusters of compact, cylindrical, scaly little bodies; these are the young catkins, which if the weather be at all propitious, by the new year will have begun to lengthen out, and will continue for the next three months to adorn the hedgerows and copses with their yellow feathery tassels. But even such precocious blooming will scarcely warrant the glowing language of a contributor to a contemporary paper, published during the current month of March: "Late in October, when every blossom except the road side aster has gone, what more attractive than this tangled bush, with its prodigal efflorescence of yellow petals on every stem and leaf-stalk, giving notice to every passer by of its laggard blooming, by the delightful pungent odour which greets him while yet a long way off." One must charitably conclude that the writer is describing the hazel of some other clime than that of Britain, or that he claims the poetic license and that his language is flowery rather than accurate.

The catkins of the hazel which contain the stamens attain a length of three inches, and every separate scale is seen to shelter eight stamens; from their pendent position each downy scale acts as a penthouse to shield the anthers from the rain, and keep the powdery pollen dry so that it may be easily carried by the wind to the waiting stigmas. As illustrating the prodigal profusion of pollen produced by the hazel, I have counted the scales on a very moderate sized catkin and found them to exceed 150, which with eight stamens to each scale gives 1200 stamens in a catkin, and as there are on an average at least three staminate catkins to each cluster of stigmas, that would give the enormous number of 3600 stamens concerned in the production of the two or three perfect nuts which are found together in autumn. As each stamen contains a quantity of powdery pollen, this explains the dense clouds of yellow dust which are shed by every passing breeze over a hazel wood, and leads to the query "Whereunto is this waste?" It is a notable fact that almost all catkin-bearing trees produce their flowers before the leaves, so that the dispersion of the pollen may not be intercepted by the foliage. The pistillate or fertile flowers of the hazel are borne in little bud-like bodies, sessile upon the young trees. At first they so closely resemble the leaf-buds as to be undistinguishable, but in January or February a close inspection will detect

the rosy pink stigmas, protruding from the downy scales in which they are swathed. If one of these flower-buds be dissected at this stage, after the outer scales are removed, the bundle of pink styles will be seen arranged in pairs, with a small hairy scale at the base, the ovary is so small as to be scarcely visible to the naked eye. And, although fertilisation is accomplished at this early season, it is a month or two before any apparent change takes place in the ovary itself. In the course of the summer the outer scales fall off, and the ovary begins to enlarge and assume the nut-like form, whilst the scale at the base develops into a sheathing leaf, with torn and jagged edges, forming the cup-like involucre. Up to the end of summer the nut contains only a milky fluid, and autumn is well advanced before the embryo or kernel has obtained consistency or shape. It is a curious fact that although there are two styles, and the immature ovary is two celled, with two embryos, one of them is almost invariably abortive, and it is very rarely that a nut is found with two kernels, and when it does occur, like the four-leaved clover, it is a lucky presage for the fortunate finder.

Economically, the hazel is servicable for a variety of uses. Its quickly growing young stems are remarkably tough, pliant and elastic, they are much used for making walking-sticks, fishing-rods, crates, hurdles, and the rougher kinds of wicker work. A curious custom was anciently in vogue, and widely prevalent, in the unprotected graveyards throughout the country, viz.—the binding the newly laid sod of the graves with osiers or other saplings, to prevent them from being despoiled by irreverent feet. Numerous allusions to this practice is to be met with in the older poets, thus :—

“ But plait a wand o’ bonny birk
And lay it on my breast.”

Gay repeatedly alludes to it—

“ Stay, let me pledge, ’tis my last earthly liquor
When I am dead you’ll bind my grave with wicker.”

and again :—

“ With wicker rods we fenced her grave around
To ward from man and beast, the hallowed ground,
Lest her new grave the parson’s cattle raze,
For both his horse and cow the churchyard graze.

The wood of hazel is supposed to make the best charcoal for drawing purposes, as its marks can be easily rubbed out when desired. The expressed oil from its nuts is also prized by painters for mixing their colours, as it dries readily on exposure to the air. The nuts themselves are a very important commodity, many thousands of tons being annually imported, most of which are devoured by the omnivorous school-boy, who also shares largely in

the home-grown crop, the chief pensioners on which are squirrels, who not only feed upon them in the season, but with commendable forethought store away quantities for future needs. A lively bird—the nuthatch—derives its common name from its predilection for nuts as its favourite food. Its mode of cracking its nuts is curious, it cunningly inserts a nut in the bark of a rugged tree, or a fissure in an old stump or gate-post, and then, by a few well-directed blows of its strong wedge-like bill, it fractures the shell and feasts upon the kernel. Another guest of the hazel, and of whom it can be literally said “the whole thing is in a nutshell,” is the fat grub of a beetle, the eggs of which are laid in the young ovary, and the larva growing with its house finds a continued supply of nutriment till when full grown it eats its way out of its habitation and emerges into the outer and larger world. The different kind of nuts known as filberts, cob-nuts, &c., are the fruit of varieties of the common hazel, which are profitably cultivated in certain districts, a good yield is held to be synchronous with an abundant wheat harvest, and if a plantation produces a good crop of nuts every second year it is reckoned to do well. Although we are most familiar with the hazel as a low-branching shrub or bush, putting forth many stems from the root, yet it occasionally, when protected from injury, becomes a small tree. Specimens are known thirty feet high with a trunk a foot in diameter. The young twigs are downy, but the older bark becomes smooth, russet brown, beautifully mottled with lighter spots, hence the simile of hazel eyes. These markings on the bark called *benticels* correspond to the stomata, found on the epidermis of leaves and the younger growing portions of plants, their function is to admit air to the underlying tissues. They form starting points for the formation of cork in the bark, and the cell of which they are composed are always loosely arranged so as to leave interstices between. The common hazel has a very wide geographical range, extending over the whole of Europe. In our own country it is found in every county, and reaches an altitude of 1900 feet in the highlands. It is the floral badge of the Clan Colquhoun. In the language of flowers it is the emblem of reconciliation.

A vast assemblage of legends and superstitions cluster around the hazel. Ever since it was employed by the astute oriental shepherd to increase the number of his flocks and herds, it has been popularly assigned as the magic staff of the wizard and soothsayer. The divining rod (see *Young Naturalist*, vol V., p. 78) was preferably formed of the young twigs of the witch hazel, and its use in these enchantments doubtless originated this common name. In ancient mythology it was sacred to Thor, the god of thunder, and in various countries, certain incantations with hazel wands were believed to avert the evil influences of thunder, as also to ensure for the husbandman a prolific

crop. In our own land we cannot overlook the custom, now almost obsolete, of divination by nuts. The genius of Burns has graphically portrayed the procedure necessary to invoke the mystic spell, and his inimitable poems of Hallowe'en will be admirably read after the simple practice has been forgotten :—

“ The auld guid wife's weel-hoordit nits
Are round and round divided,
And merry lads' and lasses' fates
Are there that night decided ;
Some kindle coothie side by side
And burn thigither trimly ;
Some start awa' wi' saucy pride
And jump out-oure the chimlie
Fu' high that night.”

The generic name of *corylus* is from the greek *koros* a cap, an illusion to the cap-like form of the involucre of the nuts. The specific name *avellana*, is a territorial name for Abellina in Asia, supposed by some to be the valley of Damascus, anciently celebrated for its supply of nuts. The common name of hazel is the Anglo-Saxon “*hæsl*,” and is the universal name in all the Germanic languages for the hazel tree. According to some authorities it is from “*hæs*,” a behest, or order, because a hazel stick was used to enforce obedience amongst cattle and slaves, being used as the baton of the master it became recognised as the symbol of authority. Another explanation is that “*hæsl*” means a cap, and refers to the involucre of the fruit. The term filbert as applied to one of the varieties of the hazel nuts is said to be a contraction of “full beard,” from the large sheathing bract or leaf of the husk, enveloping the fruit. The term “catkin” as applied to the inflorescence of the hazel, willow, &c., refers to their less or more distant resemblance to a cat's tail. In some localities the hazel catkins are called “lamb's tails” to distinguish them from the willow, and both are indiscriminately gathered and used as “palms.” In Gaelic the hazel is called “*calltwim*” from “*coill*,” a wood or grove. New Year's time is called “*coill*,” for then the hazel is in bloom, and it was believed that the first night of the new year, when the wind blew from the west, was the night of the foundation of the trees.

LIZARD WITH TWO TAILS.—A specimen of the common lizard (*L. Vivipara*) was taken here in September last, which had two tails. About an inch and a half from the tip of the normal tail, a second tail branches off. This second tail is about an inch long and is perfectly developed. The specimen has been preserved in spirits.—GEO. A. HARKER, Liverpool.

THE ROOK IN CAPTIVITY.

BY F. W. HALFPENNY AND S. H. VEALE.

It is generally acknowledged that the rook is an exceptionally intelligent bird, but until we had experience with several in captivity, we were in ignorance, as we believe many other people are, of the fact that it could be tamed.

To capture an old rook would seem a rather difficult task, and indeed it is so with the ordinary apparatus, but the march of civilization brings new inventions forth from day to day of which the cunning rook has no ken. One of these is the American wire rat trap, and the birds captured fell easy victims to the bait of a piece of bread, fixed on one of these traps concealed by a little grass. A jackdaw was also caught feeding with the rooks.

Our first business after securing our birds was to clip their wings and tails, and turn them loose in the garden. At first the loss of their power of flight seemed to puzzle them, but they speedily became used to their new surroundings. In less than two days they would catch any object thrown to them, and in less than a fortnight they would come to food at call. Only when having them under such close observation could we become acquainted with their droll and artful habits, and we then noticed a wide difference between the tameableness and intelligence of the individual birds.

To gardeners, tame rooks would be invaluable, for they are at work from morning till night digging up insects and grubs. They have also a knack of pulling up small plants to examine the roots, but they are almost sure to capture some grub or insect that would be injurious to the plant when they do so. Our experiments proved that only when in a starving condition will they eat grain; this they undoubtedly do, and also appear to be fond of a piece of bread. If a mouse were given to them they would kill it, by a sharp peck upon the head, which spits the skull; they then proceed to skin it. At this business they are wonderfully clever, skinning a mouse completely, and swallowing it in about two minutes.

We lost one of them through fighting. It was a regular pitched battle, and seemed to result from an old and standing animosity. The defeated bird had both its eyes pecked out and died shortly afterwards.

It was highly interesting to watch them lay traps for grubs, which they did by making little piles of decaying leaves, or arranging bits of slates in favourable positions; the material they liked best, however, for this purpose was little pieces of carpet. These they would carefully unroll and place flat down in some moist shady spot. Every morning when let out they would

hop off immediately to the traps, and cautiously turning them over, meet with considerable and well deserved success.

Of the ultimate fate of the three rooks we kept, it may be interesting to say something. One was killed in a fight as I have described, a second was given away to a friend, and the third, a fine handsome fellow, came to grief whilst trespassing in some one's garden. We afterwards heard that in his search for food he had uprooted nearly four hundred hopeful young cabbage plants. From our experience, however, we were enabled to pronounce the rook as an amusing pet, far more interesting than the jackdaw and many other birds in captivity.

APANTELES GLOMERATUS AND MESOCHORUS ACICULATUS.

BY G. C. BIGNELL, STONEHOUSE, PLYMOUTH.

"IN September last the enclosed flies were bred from the cocoons sent herewith, they came out of a black and yellow caterpillar on cabbage, which I suppose was *Pieris brassicae*, I have set them as well as I could. They do not look alike. Are they males and females of the same species?"—J. ROSEWEAR.

The flies you have sent are two species, viz., *Apanteles glomeratus*, and *Mesochorus aciculatus*. The former is a parasite of *Pieris Brassicae* and *rapae*, and the maker of these small cocoons. These cocoons, like miniature silk-worm cocoons, may often be found on wales and fences of cabbage gardens beside their victim, and numbering from forty to sixty from one caterpillar.

On the 14th September, 1883, I obtained a large caterpillar of *P. brassicae*, and being such a fine specimen, I thought it would produce an extra large insect, instead of which, a few days after I brought it home, there issued from it, the extraordinary number of 142 larvæ of *A. glomeratus*; and to show how they vary in number, on the 21st September, a week after bringing home the large caterpillar, I secured from another cabbage garden some very small larvæ of *P. rapae*, not half-an-inch in length, and three of these were infested, but only had one larvæ in each; they left their respective victims before they (the victims) were half grown; these produced flies almost twice as large as those that came out of the *brassicae* larva mentioned.

Those from *rapae* did not appear as flies until the following June, whereas many from the *brassicae* emerged in October, and the remainder in May and June following.

Mesochorus aciculatus is a hyper-parasite, i.e. a parasite on *A. glomeratus*, consequently they would emerge from the cocoons made by the victim, and

from this procedure it will be plainly seen how the balance of life is kept up, the latter to prevent an undue number of white butterflies, and the former to prevent *glomeratus* from exterminating *P. brassicae* and *rapae*. Dean Swift very quaintly remarked* "The vermin only tease and pinch, their foes superior by the inch; so Naturalists observe, a flea, hath smaller fleas that on him prey, and these have smaller still to bite 'em, and so proceed *ad infinitum*." This does not sound so poetical as the new version "Big fleas have little fleas upon their backs to bite em, and little fleas have lesser fleas, and so *ad infinitum*."

In this country very few people know the enormous amount of good these parasites do for the community. Take for instance a species not indigenous to a country, and see how they will increase, provided the climate be suitable, and food abundant, until they become a pest and a nuisance. This can be illustrated by an insect we all know so well, the small white butterfly *P. rapae*, which was imported into America a few years ago, it is said by an enthusiastic entomologist to enliven his surroundings, and make him think of "home sweet home," little dreaming of the vast amount of injury it would do to his turnip and cabbage crop, also to his neighbours and the country in general, I will quote a sentence or two from the *Canadian Entomologist*, 1880—"This insect (*Pieris rapae*) was brought from Europe to Quebec a few years ago. From Quebec it has spread over an immense area, extending now from Alabama to the waters of Lake Superior, eastward to the Atlantic, and westward many hundreds of miles, and over all this district it has done immense damage to the cabbage crop." A parasite (*Pteromalus puparum*) has been imported, and "Fortunately this little friend has also been introduced here from Europe, and is rapidly spreading, following in the wake of its prey, and where the parasite has fairly established itself this butterfly soon dwindles in numbers, so materially as shortly to cease to be such an evil. The butterfly spreads faster than its enemy, and is usually several years in advance of it," (about 50 miles) we may confidently anticipate that this small fly will keep this troublesome insect within due limits."

The above named parasite is a much smaller fly than *A. glomeratus*; they, *P. puparum* make their cocoons within *P. rapae* after the latter has changed into pupa.

In the *Entomologist*, vol. xxi., p. 263, I recorded the unusual number of *A. glomeratus* from *P. brassicae*, mentioned above, this brought a letter from Washington, from Professor C. V. Riley, State Entomologist, requesting me as a great favour to send him all the *A. glomeratus*' cocoons I could obtain, for distribution in infested districts.

* Vol. vii. page 268, Edition 1768.

BRITISH BIRDS: THEIR NESTS AND EGGS.

By S. L. MOSLEY.

66. BUNTING.

Emberiza miliaria, Linn.

Also called Common Bunting and Corn Bunting.

MILIARIA, from millet, a kind of seed.

Size.—Length about $7\frac{1}{4}$ in., expanse 1ft., lin., to 1ft., 2in.

Plumage.—Bill yellowish, with a dark brown line along the upper ridge. Eyes hazel. The whole of the upper parts have each feather yellowish-brown, lighter on the edges, and a dark, almost black line down the centre. Wings umber-brown, with pale drab or yellowish-drab margins, narrow on the primaries and broader on the rest of the wing. Tail the same colour. Throat, sides of neck, and under parts dingy white, tinted with buff on the breast and sides, streaked on the latter, and spotted with arrow heads on the former, of a blackish-brown. Legs and claws yellowish-brown.

THE SEXES are similar in colour.

IMMATURE BIRDS are also very similar to the adults, but more tinted with pale yellow.

VARIETIES of this species are fairly numerous, chiefly pied or pale-coloured.

PIED.—A very pretty pied one is in Mr. Whitaker's collection, and he has four more specimens, and a sixth with head and shoulders white. A pied one is in the York Museum. Mr. Bond has seven or eight pied specimens killed in Cambridgeshire, Farnham, and other places. He considers pied birds common. WHITE.—Mr. Bond has a white one, tinted with lemon, and another pure white, a true albino. Mr. Marshall, of Taunton, has two white ones, and Mr. J. H. Gurney, jun., has another. Several intermediate forms also occur.

Note.—The song, if it may be called such, of this bird is a harsh grating sound, consisting of "*chi chi*" begun slowly, and runs out to a trill. The latter part is similar to rubbing ones wet finger against a window pane. When singing the bird is generally perched on the top of a wall or hedge, but sometime it sings on the wing.

Flight.—The flight is generally in a more or less straight line, but heavy and somewhat undulating, caused by alternate flappings of the wings and cessations.

Migration.—The Common Bunting is a resident with us throughout the year. In summer they may be found in pairs, but in winter they associate in small flocks, or with other hard-billed birds, and may then be found about farm yards and corn ricks.

Food.—Seeds and grain of various kinds form the staple food of this bird, In the stack-yard the Bunting is a destructive bird in hard weather during winter, and I do not remember ever having one in my hand that was not plump and fat.

IN CONFINEMENT this bird has not many attractions, except for those who wish to study its habits in an aviary. All the Buntings should have a mixed food, consisting of oats, hemp, millet, bread crumbs, meat, insects, and a paste made of grated carrot, bread and barley meal. They should also be supplied with water, and also with gravel, in which most of them delight to bathe or rustle.

Habitat.—The Bunting is found throughout Britain, from Land's End to the Shetlands, though less commonly in the north than in England. It frequents fields and cultivated parts, particularly on the higher grounds.

ABROAD it is met with more or less commonly throughout South and Central Europe wherever corn is cultivated; it is also found in North Africa, Persia, and Turkestan.

Nest.—The nest is begun sometime during May, and is placed on a bank among coarse grass or briar, or in a field among clover or tares, either upon, or very near the ground. It is composed of coarse dry grass and straw, and lined with finer grass, and sometimes hair.

Eggs.—From four to six. They are grey, tinged with yellow or purple, with irregular blackish-purple streaks, blotches or spots, and frequently lighter shades; sometimes they have a purplish-brown tint, and others have the ground nearly white.

BUTTERFLIES AROUND LIVERPOOL.

By F. N. PIERCE.

YOUR article on the British Butterflies reminds me that I have seen no record of the unusual occurrence of some of them in the Liverpool district during the year 1884.

Vanessa cardui appeared here last year in the larva state, in large quantities, all over the district. I had never taken the larva before, but I took as many as I wanted in half an hour. In other years we seldom see six or eight imagines during the season.

Vanessa atalanta also appeared fairly plentifully, though of late years it has generally been scarce in the immediate district.

Vanessa io.—In this district I have one specimen, that was at West Kirby in 1881.

Satyrus megæra.—You give as a species becoming restricted. Our experience this year tends to prove quite the opposite, I have never taken it except in one lane at West Kirby, where it was very common, until this year when it turned up all over West Kirby, and also sparingly on the Wallasey and Crosby sandhills, where, although I have worked for several years, I never saw a specimen before.

Satyrus ægeria.—This we read of as common everywhere. One specimen which I took on the wall of our garden, which is near the centre of the city, in 1878, is the only one I have seen anywhere near Liverpool.

Now, with the exception of the latter, in Mr. C. S. Gregson's local list of 1858, all I have mentioned were plentiful. Of *Vanessa cardui*, he says "plentiful where its food plant abounds; *V. atalanta* plentiful on nettles; *V. io* abundant on nettles; *S. megæra* in lanes everywhere; and *S. ægeria* has been taken on the high road from Bromborough to Eastham.

We can well understand that as a town increases, the smoke and dirt kill vegetation, and consequently drive away insects, to which cleanliness, good food, and sunshine are essential, but we cannot so readily explain the abundance of *V. cardui* and *atalanta* at certain seasons, nor yet the spreading of *S. megæra* over a district which one would naturally expect it to be dying out.

Liverpool, 11th March 1885.

THE BITTERN NESTING IN ENGLAND.

BY W. H. BATH, SUTTON PARK.

ALTHOUGH a rare occasional visitor, the Bittern had never been known to breed in these parts until last year, when I had the fortune to discover its nest. The haunt of this bird was in a thick wooded morass, at the head of one of our largest pools, which is impossible for anyone to penetrate, except after an absence of rain for several weeks. During some fine weather in June, last year, I was engaged in exploring this bog in search of the eggs of water birds. I entered from the land side, and after some little time and care spent in springing from one clump of reeds to another, in order to evade the water, in doing which I was obliged to guide myself with the branches of trees, I managed to arrive close to the water's edge. Here it was, about a yard from the pool, that I suddenly came upon the nest of this bird. It was difficult to discern at first sight, as it was almost entirely obscured from view by the quantity of vegetation which grew around it. It was built very high up out of the water, on a mass of reeds, in order to protect it, I suppose, from a sudden rising of the water, to which these bogs are very liable. It was

composed exclusively of sticks and reeds, the inside being lined with the latter. In size it was somewhat similar to a coot's nest.

The eggs were hidden from view by a thin layer of reeds, which had evidently been hurriedly put on in order to prevent their detection. On removing this I found five eggs all quite warm, which proves that the parent bird must have remained on them until the last minute. Their colour is pale ochreous brown, and they are similar in shape at both ends. They can readily be distinguished from the egg of any other bird on account of their soft velvety touch, and unusually glossy appearance.

OUR LONDON LETTER.

IN the first part of the month, the weather being mild, the common species such as *H. progemmaria*, *A. æscularia*, etc., were very abundant round London at the lamps, especially in the south; but towards the middle of the month the east wind set in, and seemed not only to check any fresh appearances, but to kill off, or cause to hide up, those which had already emerged, so much so that though a large number of Entomologists visited West Wickham Woods about this time, the reports were very disappointing. On one occasion as many as sixteen gentlemen were at work in this locality, expecting to see *B. parthenias*, *C. flavicornis*, *T. crepuscularia*, *T. piniperda*, &c., but the result was empty boxes to nearly all, though a few *L. multistrigaria* were taken on the top of Shirley Hills. It was a bright sunny enjoyable day, though there had been a sharp frost in the morning. The willows and birches in this locality are not at all forward, though the vegetation in London is unusually advanced.

Mr. Meek, the well known Naturalist, has gone for a trip to the Canary Islands, and will probably bring back with him some interesting specimens.

With reference to Mr. Hill's communication respecting *H. defoliaria*, Mr. Southey, a well known lepidopterist in the north of London, who has had a great deal of experience with the species, states that he has repeatedly taken the males drying themselves during January, and has bred them from dug pupæ, about the same date; it is also very commonly seen on the trees in Richmond Park by those searching for *N. hispidaria* during February.

Easter, with its opportunities for entomological work, will enable me in my next letter to communicate a larger list of species observed, as all the *Teniocampa* will then be out, and *A. badiata*, *A. derivata*, and *A. pictaria* will tempt entomologists to the familiar rides in Fpping Forest, for the first time this season.

DERBYSHIRE NATURALISTS' SOCIETY.

THE annual meeting of this society was held in St. Andrew's Parish room, on Tuesday evening, February 10th, Mr. Walton in the chair. In his opening remarks he said, he was pleased to see so many had responded to the call, and was most happy to be present and preside at such a meeting, for it was a real pleasure to him, and must be pleasing to many others to meet to compare notes, and discuss their views, and he wished the society every success. The Secretary's report was then read and was considered very satisfactory financially, as there was a respectable balance in hand. With regard to work, the members had reported the capture of upwards of 700 species of insects, and over 50 species of shells, within a radius of six miles of Derby. The Secretary regretted that he had no botanical record to make, nor had he any ornithological notes, but he hoped that the members would attend to these next year. He also pointed out the advisability of making more careful records, that he might complete a list of the fauna of the county. He urged that they should arrange for more field days, and spoke of their effect upon the mind and body, which these recreative excursions most certainly have.

After a few very able remarks, illustrative of the value of nature as a study, the exhibits were then laid on the table. Conspicuous amongst them was a case containing the life history of the Goat Moth (*Cossus ligniperda*), shewn by several preserved specimens, and also the full fed living larva, which was greatly admired by the younger members, it being the first time they had seen it alive. This was exhibited by Mr. Hill of Little Eaton, who seems to have a very happy knack of making the acquaintance of this larva. Next was a splendid case of *Hymenoptera*, exhibited by Mr. Pullen, who also had a fine series of Hawk moths (*Smerinthus ocellatus* and *Sphinx ligustri*) bred by himself. The Secretary, Mr. Hey, exhibited a case of British land and fresh-water shells, containing 47 species, collected in the vicinity, also a box containing the life history of the common garden butterfly, the Large White (*Pieris brassicae*), ova, larva, pupa, and imago, with pupa and imago of the ichneumon attached. Mr. Walton exhibited a box of coleoptera; Mr. Walters a case of Diptera. Exhibits of similar character by other members occupied the rest of the space. After a vote of thanks had been given to the retiring officers, and a special vote of thanks to Mr. Harwood (Vice President), officers for the ensuing year were selected as follows:—President, Rev. T. Hutchinson; Vice Presidents, Messrs. J. Harwood, and G. Sutherland, F.R.G.S.; Hon. Sec. and Treasurer, T. Hey; Committee, Messrs. J. Hill, P. B. Chadfield, G. Pullen, S. Walters, W. H. Walton, W. Hunnber, G. Longdon, T. Frickleton.—T. Hey., Secretary.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

THE annual distribution of surplus specimens took place on March 5th, and was a decided success. Owing to the liberality of various members over 1500 specimens were available, many good species being amongst them. The drawing was conducted in the usual manner, the members drawing lots for order of choice, taking one specimen each first, then two specimens each, and so on, doubling the number each round, until the whole number were disposed of.

Owing to various causes, and the amount of business before the Society, the weekly discussions have been interrupted, but it is hoped to renew them at an early date. The discussion on *Pieris daphidice* was especially interesting, on account of the presence of Mr. Jobson, who has taken the species on three occasions, between Cambridge and Newmarket, one specimen being found hardly dry, and he is confident that it breeds there, feeding on the wild mignonette, which grows in profusion by the road sides. This is in opposition to the theory that they are visitors only, mentioned in the last number of the *Young Naturalist*, otherwise that article was generally agreed with, the increasing scarcity of *P. phlaeas* and *S. megæra* being especially commented on.

The meeting of March 19th was devoted to the discussion of the life-history of *Colias edusa*, the subject being introduced by Mr. Sheldon, who gave some interesting particulars. The question of its erratic appearance naturally attracted a good deal of discussion, the theory of immigration in the spring being the most favoured. The occurrence of the variety *Helice* also gave rise to considerable argument, and altogether the discussion proved most attractive. Mr. Russell exhibited young larvæ of *N. triangulum*, *N. festiva*, *T. orbona*, &c., captured this spring, they are about quarter fed. Mr. Russell also presented to the Society's foreign collection fine specimens of *B. cecropea*, *B. cynthia*, *B. promethea*, *P. apollo*, *V. antiopa*, *A. lathonia* and others.

EXCHANGE.

I am wanting larvæ of *segetum*, *exclamationis*, *æsculi*, *ligniperda* and *grossulariata*, also *Carpocapsa pomonana* and larvæ; specimens of American blight on apple trees. *Otiorrhynchus sulcatus*, and larvæ; pupæ of daddy long legs and wire worm beetles, larvæ of cockchater, &c. Will give good return in insects or birds eggs.—S. L. MOSLEY, Beaumont Park Museum, Huddersfield.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

MAY.

CHEER up, ye sad! awake, ye dreamers! sloth and sorrow put away,
For Summer bright is coming: hark to her herald May!
As with hawthorn branches waving, he calls aloud "Give ear!
The sovereign of the seasons all
Is coming. Listen to her call
And greet her gladly, great and small,
The Queen of all the year!"

The flowerets hear the summons down in their lowly beds,
And blushing like the morning sun lift up their modest heads,
The trees array, in richest green, their branches old and sere,
Her deepest tint assumes the sky
And every fragile fluttering fly
With rainbow's splendid colours vie,
To welcome Summer dear.—*Anon.*

There is but little need to descant on the pleasures of a country walk on a bright May morning. When the birds are singing merrily, cheering with sweet love-songs the hearts of their little wives, now engaged in tedious "household affairs." When the hawthorn hedges are covered with their snowy blossoms, and beautiful butterflies, looking indeed like "living flowers," are disporting themselves in the warm sunshine. My readers can, of course, imagine it all, and it is unnecessary to more minutely depict it.

"Is there a heart that beats and lives
To which no joy the spring-time gives,"

asks good old Bishop Mant, and we can but re-echo his question.

The work of the student of insect life is fast increasing, and space will not admit of describing more than a portion of it. No matter what order he takes up there is plenty of employment in it for his brains, eyes, and hands.

I am compelled to devote this chapter entirely to Lepidoptera, as I have so much to say about them.

May brings us to a numerous assortment of butterflies and moths. If we visit the woods we shall see the Hairstreak (*Thecla rubi*) flutter by "like a living leaf;" and the butterfly whose wings are dashed with green and tipped with rich orange (*Anthocharis cardamines*), may be seen in plenty. One may also see the Fritillaries *Argynnis euphrosyne*, *A. selene*, and *Melitæa artemis*, and perhaps the "Duke of Burgundy" (*Nemeobius lucina*.) It is there too, that

"The Chequer'd Skipper as you tread
Sprints lightly from its grassy bed."

And not only *Syrichtus malvæ*, but *Thanaos tages* and the common *Hesperia sylvanus* may be seen on a sunny day. The common *Chortobius pamphilus* also flutters along,—

"And like a fragment from the sky
Sweet *Alexis* gambols by."

(*Alexis*, of course I need hardly say, is the *Lycæna icarus* of Mr. Robson's, list.) Among other butterflies which fly in May are *Polyommatus phlæas*, *Satyrus ageria*, the local *Melitæa cinxia*, and also *Lycæna adonis*, *L. argiolus*, and *L. agestis*, which I must content myself with merely mentioning.

I must not omit from my list of the Rhopalocera for May, the Swallow-tailed butterfly (*Papilio machaon*), the Wood-white (*Leucophasia sinapis*), and the rare *Pieris daphidice*, the occurrence of which in Cambridgeshire, I was very pleased to see recorded, in the account in last month's *Young Naturalist*, of the doings of that excellent association "The Haggerston Entomological Society". In all probability Mr. Jobson is quite right in his surmise that it breeds in the locality in which he found it; if so, I earnestly hope entomologists will take care not to extirpate. For my part, although I shall look out for it, and shall be delighted to meet with it—should I be so fortunate—I shall certainly not box any.

By way of introducing the subject of moths for May, I cannot forbear quoting further from the poem from which I have just been giving some stanzas, and which (signed T. F.) appeared in the long defunct *Entomologists Weekly Intelligencer*, some odd numbers of the last volume of which I found one day lying in a second-hand book shop, and promptly purchased. It is "An Invitation to the Woods," the wild woods where

"Clouded bordered moths unfold
Their tender wings of speckled gold,
Where *Fnciformis* quivers round
The stems with honeysuckle bound,
* * *
Where *Falcula*, whose hooked wings
Have eye-like spots, to the birch leaf clings,
While near it, where the catkins play
Papilionaria larvæ stray.

Besides *Venilia maculata* and the other moths mentioned in the above lines, *Macroglossa bombyliiformis*, *stellatarum*, *Sesia culiciformis*, *sphéciformis* and *apiformis* occur in May, as also do *Saturnia carpinii*, *Thyatira batis*, *Dianthæcia cucubali* and *Stauropus fagi*.

The Hawk Moths, *Smerinthus populi*, *tiliæ*, *ocellatus*, *Sphinx ligustri* (end of the month), and *Chærocampa porcellus* also emerge in May. It is, of course, unnecessary to do more than merely mention such well-known species.

Among the Geometrina flying in May, we have the common and well-known Brimstone Moth (*Rumia crategata*), which keeps out all summer, the Speckled Yellow (*Venilia maculata*), the Pale Grey (*Selenia illustraria*), the generally distributed Scalloped Hazel (*Odontopera bidentata*), which the young naturalist will probably find at rest on oak and other trees, or capture at light. The ochreous and not very common Waved Umber (*Hemerophila abruptaria*), which looks very much like a chip of wood as it sits on palings with all its wings expanded, the rather scarce *Tephrosia consonaria* and *punctulata*, *Ephyra porata*, *punctaria*, *trilinearia*, *omicronaria*, *orbicularia*, and *pendularia*.

The whitish, fuscous dusted, Cream Wave (*Acidalia remutata*), with pale fuscous band, and in size the same as the common *A. aversata*, comes out at the end of the month. It is generally distributed, but cannot by a long way be considered abundant everywhere, although it is plentiful in some localities. The Common White Wave (*Cabera pusaria*) also appears in May and its related species the rare *C. rotundaria* and the abundant *C. exanthemata* come out. *Pusaria* and *exanthemata* keep on the wing all summer.

The other May Geometrina are the Clouded Silver (*Corycia punctata*), *C. taminata*, the Latticed Heath (*Strenia clathrata*), the Brown Silver Line (*Lozogramma petraria*), the Common Heath (*Fidonia atomaria*), the Bordered White (*F. piniaria*), the rare and local Yellow Belle (*Aspilates citraria*), the Common Clouded Border (*Lomaspilis marginata*), which keeps out until the end of July where fallows are plentiful, the rare *Pachycnemia hippocastanaria*, the uncommon Netted Pug (*Eupithecia venosata*) and others of the genus, as *consignata*, *pulchellata*, *plumbeolata*, *satyrata*, *castigata*, *irriguata*, *indigata*, *nanata*, *vulgata*, *assimilata*, *exiguata*, and *coronata*; together with *Lobophora sexalista*, *Ypsipetes ruberaria*, *Y. impluviata*, *Melanippe biriviata*, *M. montanata*, *Coremia propugnata*, *C. ferrugaria*, *C. unidentaria*, *Scotosia certata*, *Cidaria russata*, *C. suffumata*, and *C. silaceata*.

On oak trees we may find this month the caterpillars of *Catocala promissa* and *N. hispidaria*, and on hawthorn those of *Hemithea thymiaria*, and (in its localities) *Pieris crategi*.

Omitting mention of such species as were alluded to last month, the following are a few of the larvæ to be found in May:—* *P. pilosaria*, on oak; *N. zon-*

aria, on yarrow; **B. abietaria*, on fir; **G. papilionaria*, on birch, beech, &c.; *P. bajularia*, on oak; *A. grossulariata*, on currant; *T. adustata*, on spindle; *H. rupicaprararia*, on hawthorn, sloe, &c.; **H. leucopheararia*, on oak; **H. defoliaria*, on sloe, hawthorn, &c., it is reddish-brown in colour, while *rupicaprararia* is bluish-green and velvety with whitish-green back; *A. æscularia* (pale green, marbled with darker), also on sloe and hawthorn; *C. brumata*, on various trees; *O. dilutata*, on oak and elm; **L. multistrigaria*, on bedstraw; *S. vetulata*, on buckthorn; *C. psittacata*, on lime, apple, rose, &c.; *C. prunata*, green, on currant, &c.; *C. populata*, on bilberry; *T. chærophyllata*, on chervil; *O. dentalis*, in the stems of Viper's bugloss; *B. verticalis*, on stinging nettle; *N. cucullatella*, on sloe, hawthorn, &c.; *N. cristulalis* and **N. strigula*, on oak. Those marked with a star occur also in June.

As the leaves grow larger, on what but a very few weeks ago were naked branches, the little wriggling Tortricina larvæ make their appearance, and roll them up or fasten them together with silken threads, and so make for themselves snug habitations. Some of my readers may not, perhaps, have yet taken up the study of the Tortrices, but by way of inciting them to do so, and at the same time affording them some assistance in this rather difficult group, I will briefly mention some of the larvæ we may expect to find this month.

Every one who has a garden of his own, or access to a garden or orchard of some one else's, must have noticed the bluish-green black-spotted wriggling caterpillars, living between united plum and other leaves; these are the larvæ of *Tortrix ribeana*. The dark olive-green white-spotted caterpillars, feeding between united leaves of lilac and most other trees—garden or otherwise—produce *Tortrix rosana*. These last have brownish heads, while those of *ribeana* have either black or green ones. The greenish-grey larvæ of *Batodes augustiorana* with green heads, and the brown black-headed larvæ of *Spilonota ocellana*, also feed in May on a variety of trees.

The little yellow caterpillars with pale brown heads we find this month feeding between united leaves of apple, rose, and other trees, are the earlier stage of *Dictyopteryx holmiana* and the dull olive green black-spotted ones, with black heads, we see on hawthorn and sloe are the larvæ of *Penthina cynosbana*. The dark red brown black-headed caterpillars we sometimes find in the south of England feeding between folded willow leaves, produce *Antithesia salicana*, and the pale yellow (also black headed) larvæ, uniting willow or sallow leaves, are those of *Hypermezia augustana*.

The bright green larvæ of *Penthina capræana* feed on the shoots of sallow, and those of *Ditula semifasciana* on the shoots and catkins. Those of *Penthina picana* also feed on the sallow catkins.

On oak trees we may find the green minutely-spotted *Tortrix viridana*, with a brownish head, and the, also, green brown-headed larvæ of *Catoptria fulvana*. This last is darker in colour on the back. Other species we may beat out of oak trees, are *Pædisca corticana*, *Ptycholoma lecheana* and the dull olive, white-spotted and black-headed *Tortrix xylosteanæ*. *Corticana* feeds on hawthorn.

I have no room for mention of any other *Tortrix* larvæ, nor yet for the imagines of the group, and for lack of space I am able to say nothing about the *Tineina* for May, although many interesting species occur.

Cambridge.

JOTTINGS ON BUTTERFLIES.

By J. R. S. CLIFFORD.

Your capital article on the British Butterflies set me ruminating on what I have noticed during the last thirty years or so—1855-85. I send you my notes, which may interest you personally, or perhaps be worthy of publication.

ARGYNNIS PAPHIA.—Much rarer than formerly in all parts of England, and can only be looked for with certainty of finding it by going to the New Forest, and our few remaining forests and extensive woods. I saw it plentifully in the woods, near Gravesend, some thirty years ago, and it was said its brethren *A. adippe* and *aglaia* were taken occasionally in the same district. All the *Argynnidae* that particularly haunt woods, have suffered from the “grubbing up” carried on so mercilessly, and it is likely most of them will disappear, *A. euphrosyne* perhaps may stand its ground. *A. selene* used to be taken on patches of woodland, not far from London, as on the shrubby portions of Wimbledon Common, but it has become very restricted as to localities. Another circumstance that tells against these fritillaries is the fact that they have generally what is called a “metropolis,” or assembly ground. When this is discovered by a party of collectors, it is easy to net the insects by the score, and then, of course a smaller number will be seen the next year.

A. LATHONIA.—There seems something peculiar in the habits of this species, we could scarcely suppose it one that would be likely to migrate on the wing, nor be borne across the channel on board a vessel. Several specimens were taken in the neighbourhood of Gravesend, during the Autumn of 1868, and a Mr. Price, whose testimony was recorded as reliable by the late Edward Newman, captured twelve specimens one season in a wood near

Shoreham. This looks as if the species bred in some districts, although the event may be very occasional.

MELITÆA ARTEMIS.—This and other kindred species have suffered considerably from the hands of collectors, and the cultivation of many pastures or heaths that used to afford them a quiet retreat. The weather of our winters, during the last fifteen or twenty years has, on the whole, been very unfavourable for the hibernating larvæ, which have frequently been killed off in numbers by the dampness, far worse to them than dry cold.

VANESSA C-ALBUM.—Mr. Robson has remarked that this butterfly has vanished from some of its northern habitats, but it is still tolerably common in the midland counties. I should like to know what caused its disappearance from the hop districts of Kent, which yielded it abundantly in the good old times of George III., according to the statement of our earlier entomologists. Perhaps a succession of windy and wet winters gradually exterminated the hibernating females, less careful than others about shelter.

V. POLYCHLOROS.—Certainly less frequent than it was twenty or thirty years ago, but never a generally common species, though many specimens might be occasionally taken near an elm or willow on which the caterpillars had fed, as they are gregarious. It is a curious fact that a dwarfed type of this species has been observed here and there, not readily distinguishable from the allied *V. urticæ* and some have suggested it to be a case of hybridism, but this is doubtful.

V. Io.—I have not visited the Surrey localities recently, where I regularly saw this butterfly. In North Kent, where it was, many seasons, nearly as abundant as *V. urticæ*, I have not observed a specimen for some years, and I noticed a perceptible diminution year by year previously, yet its life-history resembles that of *V. urticæ*. May not this be the result of a great increase of some parasitic foe?

V. ANTIOPA.—If Lewin's account is to be depended upon, it is proof positive, that towards the end of last century, the butterfly bred in England, as at Faversham and Camberwell.

V. CARDUI.—Capricious in its appearance, but the septennial theory will not always hold good, for I have seen it two or three years in succession, both in Surrey and Kent. It would be more numerous, perhaps, were it not for its remarkable boldness in approaching mankind, though its power of flight is quite equal to that of the stronger-winged species of its tribe. At all events specimens are still obtainable from time to time, especially where thistles are abundant, and there are fields of clover or lucerne.

LIMENITIS SYBILLA and **APATURA IRIS**.—Both these might have been specified by Mr. Robson, as species fast decreasing in numbers. The cutting down of woods has affected them, and the monarch of our woods has been more freely captured since his fancy for game has been found out.

SAIYRUS ÆGERIA.—It is, in Kent, rarely to be seen beyond the boundaries of a wood, and I have never seen the insect in the early part of the season, but in July or August, though it is stated to fly in April or May. As there are, according to Lewin and Doubleday, two, or even three broods; it might be more regularly seen in its localities, but I believe it to be of decidedly sluggish habits, hence, apt to be missed by the observer or collector. Herein it is very different from *P. megara*, which loved to flaunt itself on walls and banks, yet it is less plentiful about the lanes of Kent, Middlesex, and Surrey than it was when I first collected.

S. HYPERANTHUS.—We cannot say in the south that this species has vanished from view, yet it has markedly fallen off in numbers. I have seen it so plentiful in Kentish woods that hundreds might soon have been netted, not so now. It has gone entirely from several of the parks and copses near London, once its abode.

LYCÆNA ADONIS.—Used to occur in profusion upon the chalky banks, and in the lanes of North Kent, say thirty or forty years ago, commonly accompanied by *L. corydon* in equal abundance. Both have become much scarcer, and in some seasons very few indeed are captured. They are very capricious in their time of emergence from the pupa, but it appears to be but one annual brood.

L. ALSUS.—I believe with Mr Robson, this has ceased to be found in many places where it formerly bred, yet it is also to be remembered that it is a butterfly apt to be missed by collectors, from its diminutive size, and sluggish, retiring habits, so far as I have been able to notice, for it will start at the beating-stick out of places where we should not have expected to see it.

L. ARGIOIUS.—Twenty years ago this was nearly as abundant as the Common Blue in Kent, and some districts of Surrey, and double-brooded. It is now rare, though the food-plants have not been interfered with.

COLIAS EDUSA.—It is a species so attached to many of the clover and lucerne fields in the neighbourhood of Gravesend and Higham, that I conclude it breeds there regularly, only in some seasons the number of specimens is comparatively small. I have seen hybernated individuals, and should infer it generally oviposits during the spring. Whether the profusion of some years is to be accounted for by the arrival of parties of immigrants, I cannot say positively.

GONEPTERYX RHAMNI.—This is one of our butterflies which appears yearly in about an average number, where it is found at all, and is seldom lacking if *Rhamnus catharticus* or *R. frangula* grow in a locality.

LEUCOPHASIA SINAPIS.—Now scarce in many of the woods which are reported to be its habitats. I should think it has been influenced by the ungenial springs of late years, killing the female ere oviposition in April.

ANTHOCHARIS CARDAMINES.—Has disappeared from numerous places near London where it used to be common, this is, however, due to local causes, such as the proceedings of builders, or the conversion of grass fields into market gardens. Farther away in various districts of Kent and Surrey, it is to be taken much as formerly.

HESPERIA SYLVANUS.—This is, at least, one instance of a butterfly quite as common now, wherever I have observed it, as it was thirty years ago; not so, it seems, in the north.

HESPERIA LINEA.—When the late Edward Newman wrote his *British Butterflies*, he noted that this species (which is not recorded in Scotland) had gone from a large proportion of its old localities in England; it is certainly much less common along the chalk banks and ridges of Kent than I have seen it in the past.*

Gravesend.

THE LEPIDOPTERA OF LONDON.

By ERNEST ANDERSON.

THERE is one great thing to be said in favour of the study of Lepidoptera as a recreation, and it is that no matter how we are situated, or where we may be, it will nearly always be found possible to meet with objects with which to amuse ourselves and to investigate. To some, this may appear too bold an assertion, but if they will only turn their attention to the subject, they will find that even in the most densely populated portions of large cities, there will still be found several species of Lepidoptera, which maintain a precarious existence amid the dirt and squalor, which are, alas! too prevalent in such localities.

The common white (*Pieris rapæ*), after barely escaping mutilation from the ragged urchins in the court below, flits to the make-shift window box, which constitutes some inhabitants only garden, and obeying the law of

* I shall be pleased to have further reports on Butterflies, and will reserve anything I may have to say in reply for the present.—J.E.R.

nature, deposits ova upon the mignonette or straggling nasturtium, and thus secures the advent of another generation. The omnivorous larvæ of *Hadena oleracea* and *Mamestra brassicæ* may be found almost wherever there is a patch of herbage; and everyone must be familiar with those random visitors which come dashing in at our open windows on a warm summer's evening, and after vainly trying to find an exit in the ceiling, fly in a distracted manner round the light, and finally terminate their mad career by a sudden rush through the flame, dropping a shrivelled and frequently unrecognisable mass before us. All this may be observed even in the heart of cities, and when we get a little way out to where suburban gardens and public parks give a better chance of existence, we shall find that there are ample materials for forming an interesting and instructive collection. It will be some time before the young naturalist will be able to say that he knows all the species inhabiting his district, and longer still before he can trace their life histories for himself, and confirm or refute the particulars given in our works of reference. I myself, after six years close observation in this district (Hackney), am still unacquainted in practice with the life-histories of several of the species found here; and each year I discover, with surprise, some species which had previously escaped my notice. As an instance I may mention that on the 24th of Feb. this year (1885), I captured a male *P. pilosaria*, at rest upon a lime tree in one of our streets; this species I had never before seen in the locality in any stage of its existence. I think, therefore, that I am justified in maintaining there is ample work to be found for the Entomologist even in the heart of London or any other large town, and those who love the study, but are debarred from pursuing it amid the green fields and glades of the country, either from want of time, means, or any other cause, can still form a very decent collection from out the streets, which their daily occupation causes them to traverse. In order to show what can be done in this manner, and with a view of helping those who may feel inclined to form such a collection, I propose to enumerate those species which have come under my observation in the east of London, and most of the species will, no doubt, be found in similar localities.

To commence in the orthodox manner I must first speak of the Diurni or Butterflies. As might be expected there are not many of them, for their diurnal habits render them conspicuous, and consequently they easily fall victims to the London sparrow or street Arab. Two species, however, seem to brave these and other dangers, and yearly enliven by their presence the long rows of dismal houses which constitute such a great portion of London, of course I mean the Large and Small Whites, *Pieris brassicæ* and *Pieris rapæ*. They appear first about the beginning of May, or in favourable

seasons at the end of April; and many people do not consider spring to have really arrived until they see the first white butterfly. They continue to be seen throughout the summer, and the larvæ may be found on geraniums, nasturtium, mignonette, &c., resting on the mid-rib of the leaves, and being of very sluggish habits, they are not observed much until they begin to look about for safe positions in which to pupate, at which period they may generally be seen on every fence and under every ledge. Frequently, too, we shall remark a mass of little bright yellow cocoons, which appear upon examination to be spun all around a dying or dead caterpillar, these are the work of the larvæ of a minute ichneumon fly (*Microgaster*), which perhaps does more than anything else to keep down any undue increase of these species.

I do not think any other butterflies breed in London, though *Vanessa urtica* is a frequent visitor to our flower beds, and occasionally is accompanied by *V. atalanta*, which from its strong build and powerful flight is well adapted to travel some distance. Another occasional visitor is *Colias Edusa*, which in 1877, was observed all over the town, many making itself quite at home in the Temple Gardens on the Thames Embankment. It is interesting to remark that a very fine female was captured last autumn, on London Fields, Hackney, being in very good condition, with the exception of a piece out of one of the posterior wings, the specimen evidently having only just escaped from some hungry bird tempted by so rare a banquet. It was brought alive to Mr. J. A. Clark, the well-known lepidopterist, who presented it to the Hackney Microscopical and Natural History Society, in whose collection it now is.

Having thus briefly disposed of our butterflies, we find ourselves confronted by the Nocturni, of these we can make a better muster, though less numerous than either the Noctuæ or Geometræ. The large hawk moths are well represented. The eyed-hawk moth (*Smerinthus ocellatus*), though far less numerous than formerly, is still occasionally observed, and a few years back the larvæ were readily obtained from the Victoria Park. The poplar hawk (*Smerinthus populi*) may be called a regular Londoner, almost every poplar tree being visited by it, even solitary trees some distance from any others yielding the larvæ if carefully searched for. The moths, too, are very frequently observed on the trunks especially in the early morning, being a good prize by school boys who classify this species as a "Dragon," keeping them in their trouser pockets wrapped up in a handkerchief, a plan needless to say not very agreeable to either party. *Smerinthus Tilia* is found in most places where there are elms or lime trees. It is most frequently observed in the larval state, and after a gale may frequently be observed on railings, or ascending the tree trunks, their very rough skins and blue horn distinguishing

them from the other species. The pupæ should be dug for at the foot of these trees, or the moth looked for hanging underneath the lower branches in the early morning, it is, however, not so common as *S. populi*. The privet hawk moth (*Sphinx ligustri*), formerly no rarity in our squares, is now rapidly disappearing, it still lingers in a few places chiefly in the West-end, but there is always a chance of obtaining it whenever there is a tolerable amount of privet in an open space. It is most frequently and easily met with during the larval state in the autumn, the larvæ being fond of resting on the top shoots of the privet hedges. *Sphinx convolvuli* has been taken in Victoria Park and the neighbourhood rather abundantly, but its appearance must be considered abnormal, still when this and other erratic species do appear, the large towns seem to have a fair share of their visits, so that the naturalist should always on the look out, and must not be surprised at anything, as even the rare *D. lineata* has been taken in London.

(To be continued.)

NOMENCLATURE AND THE YOUNG NATURALIST

"LIST OF LEPIDOPTERA."

By JOHN E. ROBSON.

As this list is now approaching the completion of the Macro-Lepidoptera, it seems a fitting time to reply to all those correspondents who have favoured me with their criticisms from time to time, and I do so here, rather than privately, because I have no doubt where one has written me, there has been a number of similar opinion.

The number of changes I have adopted has caused some adverse comment, and one gentleman says "it will be as bad as South's before it is done." It would be invidious of me to attempt to compare the two, but I would say that had South's arrangement been acceptable, the alterations in nomenclature would scarcely have been of so much consequence. Let me endeavour to show, then, what rules have guided me in giving priority to one name over another. When Guenee and Doubleday prepared their lists, they examined for themselves all the authorities, and rejected for various reasons the works of authors whose figures or descriptions did not seem satisfactory to them. There was then no other list to compare with, but in the Catalogue

of Drs. Staudinger and Wocke published subsequently, the names of many of these rejected writers have been adopted, while some used by Guenee and Doubleday have been rejected. Doubleday afterwards issued a supplemental list in which some authors names were used that he had not used before, *e.g.* :

Xylina furcifera, Hufn. (1767).

conformis, W.V. (1776).

In giving precedence to Hufnagel's names therefore, I assume I have done as Doubleday would have done had he issued a new edition of his catalogue. I need not multiply illustrations.

Drs. Staudinger and Wocke have rejected names given by accepted authors that only appeared in catalogues, or were appended to species in collections. They thus rejected a great many of the names in the Vienna Catalogue (W.V. of Doubleday, Schiff of South), and gave precedence to others of subsequent date. Guenee and Doubleday, for reasons that they thought satisfactory, after full investigation, adopted the whole of the names in the Vienna Catalogue, and as they are in general use in Britain, I have still given them precedence. In one respect I have departed from the strict law of priority. Where some older name appeared to have precedence over the Linnean appellation I have, nevertheless, given the first place to that of Linneus, believing that we certainly ought not to go behind him in our investigations.

We are very inconsistent in our adoption of changes. Thus *Icarus*, Rottemburg, 1775-7, has crept into general use, displacing *Alexis*, Hubner. Yet we do not seem willing to accept *Bellargus* of the same author, in lieu of the better known *Adonis* of Fabricius, though the latter name appears full of doubt. It almost seems as if we could accept one alteration at a time, but not more. If an enumeration were given here of the species, of which the names now in general use are not those of Doubleday, I expect those who complain of the changes I have made would rather open their eyes. Even in the Butterflies, Doubleday's *Cassiope*, *Blandina*, *Davus*, *Hippochoe*, *Alexis*, &c. have been abandoned, but in every case the alterations have been made gradually as it were. If the "new names" are rightly given, they also will gradually supplant the old ones as others have done, and I have endeavoured to print them so that they can be used for labels in either case. Any one objecting to the change can cut off the upper name, while it will always be well to have both in a reference list.

What is wanted now, is, as I have said before, for the Entomological Society to appoint a committee who should (in conjunction with the principal foreign societies or leading lepidopterists), draw up a list, the names of which should be accepted by every one, and be subject to no future alteration. The

arrangement decided upon by such a committee would also have a fair chance of acceptance, and of being, if not permanent, at least the accepted arrangement for many years to come. Then we want a Manual after that arrangement and nomenclature, and we might rest and be thankful. If we cannot have this, will not Mr. Kirby let us have the synonymic catalogue of Heterocera he promised so long ago, or such portions of it as may now be ready.

A ROBIN STORY.

JOHN MACKAY.

DURING severe winters, when the ground is frozen hard, or covered with snow, and food is scarce in the hedgerows and fields, many of our little feathered songsters, who remain at home to spend the cold and dreary winter with us, soon find their way into the neighbourhood of villages and towns, where they are sure to find food more plentiful than in the open country. At such seasons it has often been noticed how tame and fearless these little birds become, when hard pressed for want of food, and I have heard many strange stories told on the subject. I take the liberty of adding another to the list, which begun last winter, and I think it will not be the least interesting on the subject.

At a large paper mill in the neighbourhood of this city a pair of robins, during last winter, were in the habit of taking shelter on cold and stormy nights in the large store room, which is attached to the works. If the day was cold they would find their way into the store room just before dark, and in the morning, when the doors were opened, and it became sufficiently light outside, they would leave the room to enjoy the few blinks of sunshine, which were to be had without, and may be go in search of food.

On very cold days when the country around was covered with snow, they would not venture to remain long outside, but would seek some snug corner within, where they would remain contentedly enjoying the warmth of the place, until such time as the weather proved more favourable for going afield.

The store room was a very large one and many workmen were constantly busily engaged, receiving and delivering great packages of goods, yet, the robins did not seem to be in the least afraid of the men, nor the great noise of the place did not disturb them. The workmen, some of whom happily were ornithologists, soon began to take a friendly interest in their little visitors, and noticing the tameness of the birds endeavoured as much as possible not to disturb them. When dinner-time came, the workmen would invite the robins to share their repast by sprinkling crumbs on the floor, and

they would confidently fly down from their place of retreat, and hop about the floor, enjoying the rich feast thus provided them, now and then looking up at the smiling workmen, with a pert twinkle in their eyes, and a merry chirp, by which, doubtless, they meant to say, "Now you are nice decent fellows too, we know you wont hurt us." The kind-hearted men soon took a great interest in the welfare of their little red-breasted friends, and felt so proud of the confidence placed in them that any ordinary person hearing them speak would have supposed them "childish." Would that everyone were possessed of a good share of that excellent quality, (a love for birds), no matter what name unthinking persons may choose to call it. When the nights were mild and the snow was off the ground, they occasionally passed a few nights in the open air, but a touch of frost would force them to seek their former retreat, where they were always sure of a kind welcome.

Gladsome spring, with its sunny showers and its array of wild flowers, came at last, and no one seemed to welcome its coming more than our little robins. Food was now more plentiful in the fields, and they spent most of their time in the open air, although, occasionally, they would take a look into the store just to see their old friends, and to assure them that though times were now changed they had not forgotten them.

But soon the inseparable pair seemed to have put their heads together, and after, I dare say, discussing the pros and cons of the question, they decided to build a house in which they might dwell, and wherein they would rear up a healthful young family of red-breasted hopefuls. The situation for their nest seems also to have been fully discussed, for one fine morning the workmen in the store were surprised and delighted to see their little feathered friends busy flying out and in, conveying material with which to build their nest. And in the coolest manner possible they selected for that purpose a quiet corner between two great heaps of paper, and there they built their nest. Their nest was completed about a month ago (March 20th), and I have no doubt that by this time a flourishing young family of red-breasts will be rejoicing their parents' hearts, and making free use of the store room. Here my story for the present ends, and if I find time to visit the locality soon, I will be happy to bring my Robin story down to date.

Tradeston, Glasgow.

OUR LONDON LETTER.

The end of March proving warm and sunny, found *T. hyemana* flying briskly among the oaks in Epping Forest, and on the 31st some half-dozen *G. rhamni* were observed gaily flitting about in a warm corner, a rather

unusual sight in the Forest, as owing to the scarcity of buckthorn, the species is very rarely met with in the locality.

The Easter holidays, however, hardly proved so productive as many Entomologists hoped for, still many of the early species were recorded, amongst which I may mention *B. parthenias*, which was on the wing in tolerable conabundance at West Wickham, from March 25th to April 10th; but *B. notha*, at sugar, has not proved at all common, and the *Teniocampæ* are all rather scarce, in fact most visits to the shallows have been rather unproductive.

The larvæ of *C. villica* seem to be more plentiful this season than they were last, and *C. caja* bids fair to be unusually abundant; *C. dominula*, on the contrary, appears to be scarce and backward, and what with landslips, the raids of collectors, and the burning of the herbage along the cliffs, it is to be feared that the species stands a fair chance of being exterminated from the celebrated locality near Deal.

B. hirtaria, as usual, made its appearance in the London parks and squares, about the 3rd April. It is a very sluggish species, and the females seem to remain in one situation for days together. The night-feeding Noctuae larvæ seem rather abundant. *A. nebulosa* is turning up commonly again, it has been rather scarce for two or three years; and I hear that *C. exoleta* has been discovered at Highgate, which, I believe, is a new locality for it. The warm rains we have just had here have given a great impetus to both vegetation and insect life, and no doubt by next month there will be much to record.

London, April 20th, 1885.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

Mr. Hockett (President) took the chair at the meeting of 2nd April, and there was a fair attendance of members. Mr. Russell exhibited a long series of *L. multistrigaria*, the specimens being remarkable for their unusually large size, they were captured March 21st, at Hampstead, and upon that date were in great profusion. Mr. Sheldon gave his experience at the shallows, and also stated that he found *L. multistrigaria* commonly in one spot in Epping Forest, and noted that *L. salicella* was out.

At the next meeting, April 9th, the President took the chair. Mr. Harper exhibited two *S. illustraria*, bred the same day from larvæ captured last autumn in Epping Forest. Mr. Clark showed a specimen of *A. prodomaria*, bred that day from a larva taken at Seven Oaks, and Mr. Anderson brought

up some bred specimens of *N. zonaria* and *L. mullistrigaria*, the latter having been fed up on hedge bedstraw, they were rather small and dark. The subject for discussion was *A. paphia*, and Mr. Russell, who has had great experience of this species in the larval state, gave many interesting details of its habits in the New Forest, which is, perhaps, its head-quarters in this country. He stated that one of the most marked peculiarities of this species is the extraordinary activity of the chrysalis; they are found on palings, trunks of trees and under holly leaves, and when the sunbeams fall upon them they agitate themselves in a very violent manner, making a very perceptible noise at the same time. This is equally the case by night if the glare of a lantern be turned upon them, and Mr. Russell employed this method to obtain them, the chrysalis immediately betraying itself if the lantern was turned upon it. Mr. Sheldon also spoke at some length regarding this species, which he had met with in Derbyshire and Merionethshire, the specimens from the latter county being larger than any others he had ever seen, Mr. Harper stated that the best time to catch *paphia* was early in the morning, and mentioned that he had at times captured a great number of the var. *valezina*. Mr. Anderson gave his experience of the species, and testified to its profusion in the rides near Lyndhurst, and also mentioned that he had taken it at Box Hill. Mr. Hockett mentioned having seen the species some years ago in Epping Forest, and after some further remarks from Mr. Pearson this very instructive discussion closed.

At the following meeting, Mr. E. Cooper took the chair, and after the usual business had been proceeded with, introduced the discussion on *Colias hyale*, giving his experiences of the species in 1868, the year in which it was so abundant. After a vigorous outline of its habits, Mr. Cooper proceeded to attack the "blown over" theory in regard to this and other species, and asked why it was that in the case of the present species in 1868 it appeared all over the kingdom simultaneously, instead of being first recorded from the coast and gradually spreading inland. Mr. Sheldon and Mr. Russell both stated that there could be no doubt that insects do migrate, and as a proof Mr. Russell mentioned that a friend of his had seen a large number of moths flying in nearly mid Atlantic, one of which was captured and proved to be a species of hawk moth; and Dr. Sequeira stated that when he was going to Australia, several hundred moths, resembling our *S. carpini*, settled on the ship before they had sighted the Australian coast. Mr. Cooper, replying, said he did not dispute that some insects do migrate—the locusts being well known instances—but he thought the theory did not apply to *C. Edusa* and *hyale*. After remarks from nearly all the members the meeting concluded, leaving this vexed question still in the same position.—ERNEST ANDERSON, Secretary.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

JUNE.

PAINTED flies in livery gay,
Summer's angels round her stray,
And birds chant their most rapturous lay,
Summer bright is here!—*Anon.*

It is no easy task to describe the entomology of June. The insects are so numerous that one hardly knows where to begin, what to speak of and what to leave out. There is plenty of occupation now for the students of any order. Not only the lepidopterist and the hymenopterist but the coleopterist finds abundance of work, and it is impossible, within the limits of a paper like this, to mention more than a very small fraction of the species the latter is likely to meet with. He will find his favourite insects almost everywhere. Running about on the ground, and now and then taking a short flight, may still be seen, in sandy situations, the Emerald Tiger beetles (*Cicindela campestris*). Under stones and logs is lying *Creophilus maxillosus*, and others of its kindred; under bark are concealed divers species of *Homalota*, *Rhizophagus*, and such like; the snow-white flowers of the fragrant hawthorn contain *Rhynchites æquatus* and many other minute species; rushes and reeds by the riverside shelter *Donacia linearis* and its relatives, and the surface of the water itself in quiet pools is enlivened by the mazy dance of dozens of whirling *Gyrini*, that never seem to tire in their playful evolutions.

The fact has just been mentioned that hawthorn blossoms give shelter to numbers of tiny Coleoptera. *Homalium florale* is sure to be there in abundance, and among the other species which may be shaken out may be mentioned *Grammoptera ruficornis*, *Adimonia sanguinea*, *Helodes lividus*, and *Cychramus fungicola*, all of which are flower-loving kinds.

On willow trees in most places in the south of England, may be found in June, the fine and sweet scented Musk beetle (*Aromia moschata*), figured

in the plate presented with the *Young Naturalist* for September, 1883. It seems to be getting scarcer than it was. I remember the time, and it is not so very many years ago either, when I had no difficulty in finding specimens, but last summer it was far otherwise, and it required a great deal of searching to find one. Possibly the experience of other and more fortunate coleopterists may not, however, be the same as mine, but it would be interesting to know whether such is the case; and I think the Editor would willingly spare a small space for a brief note on the subject, if any fellow entomologist would chronicle his experience in the *Young Naturalist*.

The handsome and well-marked species, *Strangalia armata*, may also be found in June, sunning itself on the cow-parsnip flowers, in which it specially delights, although it may also be found on other umbelliferæ. It is figured on the same plate as *Aromia moschata*, together with the smaller species *S. melanura*, which we may find in most places under the same conditions as *armata*. The wasp beetles, *Clytus arcuatus* and *arietis* (also figured on plate 7), may possibly be found this month. Neither are very common, but *arietis* is the species most generally met with. I usually find one or two in the course of the summer. I have taken *arcuatus* at Cambridge, it is the most wasp-like of the two, and I think many a person whose sight was not good enough to notice the apparent absence of wings, would take it for one of the *Vespidæ* as it sits basking in the sun on a wall.

The common "soldier" and "sailor" beetles (*Telephorideæ*) appear in June, and we meet with *Telephorus fuscus* almost everywhere. The Cardinal beetles (*Pyrochroa rubeus*) with their brilliant red elytra are also abundant this month and towards its close, the Cock Chaffers (*Melolontha vulgaris*) and Midsummer Dors (*Rhizotrogus solstitialis*) make their appearance to the delight of school boys, who capture them and make them draw paper or card-board carts, which, from their comparative great strength, they are able to do with ease. They bury themselves in the day-time and come out at dusk, when they wheel in swarms around lime and other trees in the south of England; I believe they are less common in the north.

As summer comes on the *Libellulina* begin to make their appearance and skim along with murderous purpose over the surface of our rivers and ponds. The beautiful Demoiselle Dragon-Flies (*Calopteryx virgo* and *C. splendens*) for instance are species we are very likely to see in June. The males of the former have broad forewings of a deep blue colour, and a metallic blue head, thorax and abdomen; the wings of the females are clear and brown, and the body green. In the latter the wings are narrower, and those of the males have only the central portion blue or black, the base and tips being clear; the females are similar to those of *C. virgo*. Besides these differences the

wings of the male are very finely reticulated, while in *C. splendens* the network of veins is less close.

Space will not permit me this month saying anything more about this interesting order, so mention of other species of Dragon Flies must be deferred till July.

Turning now to the Lepidoptera, we are sure to see the common Meadow Brown and Small Heath butterflies (*Satyrus janira* and *Cænonympha pamphilus*) flitting everywhere about the meadows, commons and roadsides, and other June butterflies are the northern moor-loving *Laidion* variety of *Cænonympha Typhon*, the *Davus* of Newman and Stainton; *Erebia epiphron*, the Cumberland variety of which is the *Cassiope* of Fabricius; the local *Melitæa cinxia* and *athalia*, and the rather more generally distributed *artemis*, popularly known as the Greasy Fritillary, together with the Pearl Bordered Fritillary (*Argynnis Euphrosyne*), the Small Pearl Bordered Fritillary (*Argynnis selene*), the first brood of the rare Queen of Spain Fritillary (*Argynnis Lathonia*), the tiny *Polyommatus alsus*, appositely termed the Small Blue, the Green Hair-streak (*Thecla rubi*), the Small Copper (*Lycæna phlæas*), which is common everywhere; and the very local *artaxerxes*, variety of *Polyommatus agestis*.

At the end of the month the White Admiral (*Limenitis sybilla*) comes out and continues to frequent the southern woods until the end of July. Those who live in its localities may find the pale green spiny caterpillar feeding on honey suckle (*Lonicera periclymenum*) in the early part of the month. At the same time the Common Ringlet (*Satyrus hyperanthus*) also puts in an appearance, and the pretty, Small Tortoiseshell (*Vanessa urticæ*) enlivens our gardens and roadsides, seeming almost to delight in proudly displaying its beauty to human eyes, and liking the companionship of man. And truly that individual has the soul of a savage who wantonly and unnecessarily destroys either *urticæ* or the other beautiful *Vanessas*, none of which do the slightest harm.

The moths are so numerous in June that it is impossible to mention all of them. The well known Green Forester (*Procris statices*) emerges in the early part of the month, and may be seen flying in meadows from June up to nearly the beginning of August; and about a fortnight later in its appearance, the Scarce Forester (*P. globulariæ*) flies about the Sussex downs, and keeps out such a short time that those who desire to secure it must look sharp after it. They are both very much alike. In order to distinguish them a beginner should notice the antennæ, which in the Common Forester have blunt tips, while in *Globulariæ* they are more pointed. *P. geryon* is smaller than either of the others, though it was undistinguished from *Statices* until a few years ago. The Burnet moths also make their appearance about the

same time as the Foresters, *Zygæna filipendulæ* with six spots, and *trifolii* with five spots being the earliest to appear. The Irish species, *Z. minos* var. *nubigena*, comes out about the middle of the month, and like *Procris globulariæ* is visible but a very short time. The local *Z. loniceræ* emerges at the end of the month and keeps out all through July. It may be distinguished from *trifolii* by its slenderer antennæ, and the distinct separation of the two central crimson spots. The entomologist should keep a look out for the confluent variety of *trifolii*, and the variety of *filipendulæ*, with yellow hind wings and yellow spots on the fore wings.

Other June moths are *Deilephila euphorbiæ* and *elpenor*, *Sesia myopæformis* and *formicæformis*, the Scarlet Tiger (*Calimorpha dominula*), the fern-loving Clouded Buff (*Euthemonia russula*), the Cream Spot Tiger (*Chelonia villica*), the Ruby Tiger (*Arctia fuliginosa*), of which the northern form is the *borealis* of Staudinger and *fervida* the southern form; and the Cinnabar moth (*Euchelia jacobææ*), which as far as my experience goes, although generally distributed, is not equally common everywhere: it seems to be most abundant in sandy districts. Besides these, the Lappet (*Lasiocampa quercifolia*) and *Limacodes testudo*, which occurs very sparingly in beech woods in the south, are other species occurring this month.

The brown, pink-spotted Peach-blossom moth (*Thyatira batis*), the whitish brown-banded *Cymatophora fluctuosa*, and the dull grey *C. or* may be taken in their localities throughout June, and in the case of the last named, throughout July also. At the end of the month other members of the family, viz., *C. duplaris* and *ocularis* appear, and the pale green *Dipthera orion* should be looked out for where it occurs.

The orange coloured *Angerona prunaria*, the whitish ochreous *Eurymene dolobraria*, the whitish grey *sublunaria* variety of *Selenia lunaria*, *Boarmia consortaria*, *Tephrosia extersaria*, the yellow *Asthena luteata*, the whitish many-lined *A. sylvata*, the bluish white *A. Blomeri*, *Eupisteria heparata*, the northern Smoky Wave (*Acidalia fumata*), the Blood-vein (*Bradypetes amataria*), the Peacock moth (*Macaria notata*), and the heather-loving *Scodonia belgiaria*, are a few of the June Geometrina. Others must be omitted for want of space.

Cerura bifida comes out in the early part of the month, and the smaller *furcula* some three weeks later, and about the middle of June *Stauropus fagi* should be looked out for on the trunks of beech trees or at light. The smoky brown *Notodonta dromedarius* also may perhaps by good luck be found by the young entomologist at rest on birch trees, and *Pterostoma palpina* on poplars. The brownish red *N. camolina* is also given to resting on birch trees or on palings in the neighbourhood.

Dwellers on, or visitors to, the coast should look out now at night for the grey brown, dark-marbled, *Laphygma exigua*; it has oblong narrow forewings and white hyaline hind ones. Sugar at inland localities is pretty sure to attract *Xylophasia rurea* and *lithoxylea*, *Apamea basilinea*, *A. gemina*, and *Miana strigilis*. The common *Mamestræ* too are sure to be present at the treacherous banquet which the Entomologist spreads for their more aristocratic relatives.

Acronycta aceris will probably be found at rest on sycamore trunks in several localities by those who seek for it and those two Dromios amongst moths *tridens* and *psi* are certain to be found by every one, except the most lazy Entomologist, at rest on palings and tree trunks. June is indeed the favourite month of the genus, and all but the rare *strigosa* occur now. Most of the wainscot moths (*Leucania*) come out in June, and may be taken at flowers. *Obseleta* and *straminea* are marsh-loving species, and should be looked for among reeds.

The only other noctuina I have room for the bare mention of are *D. nana*, (*conspersa*), *H. serena*, *A. herbida*, *A. tineta*, *A. advena*, *H. glauca*, *H. chenopodii*, *H. atriplicis*, *H. suasa*, *H. pisi*, *A. contigua*, *H. rectilinea*, *A. myrtilli*, *P. V-aureum*, and *E. glyphica*.

On birch and oak trees we may find in June the brown twig-like larva of *E. tiliaria*, the grey twig-like, protuberance bearing *E. erosaria*, and the grey, clouded with reddish brown, *angularia*. On heather we may find the larvæ of *F. atomaria*, and on hawthorn *T. crategi*, *E. lanestris*, *B. neustria*, *D. cæruleocephala*, *Teniocampa gothica*, *D. contaminana*, *P. variegana*, *G. leucatella*, and several others for which I have not space, and for the same reason I am compelled to omit mention of all the other June caterpillars.

Cambridge, 20th May, 1885.

JOTTINGS ON NOMENCLATURE.

By IGNORAMUS.

THE Nomenclature question is one that seems to start up every few years among Lepidopterists, and after all parties have had their fling, it remains just where it was. Are there any other classes of Naturalists that waste their time and energies in this way. I was going to add "and fill up their Magazines," but I thought that might be a hint to you to reject my article, so I will not say it. I remember a very learned controversy some fifteen or twenty years ago, between Mr. J. W. Dunning and the Rev. T. Marshall. If my memory serves me, it was on some point connected with the gender of

compound adjective-substantives translated from Greek into Latin, or something equally edifying, and equally calculated to advance our Entomological knowledge. Though I am an Ignoramus no doubt, I do not wish to imply that there is any advantage in spelling a Latin word improperly, or giving a wrong termination to a Greek one, but after a name has been accepted and is in general use, where is the advantage of altering it because the termination is doubtful, or some single vowel would have been more correct as a diphthong. The present squabble has fastened on Mr. South's List, but it did not originate with it. The fire was smouldering before, and the List in question only fanned it into flame. As far as I can make out, the conflagration originated with a proposal to call a certain doubtful pug, by the name of *Blancheata*, in honour of a young lady. It was a doubtful compliment at best, but it roused the ire of some learned entomologist, who, fearing we might be having next such names as *Pollyaria* or *Billyata* came down upon *Blancheata* with forty Nasmyth power, enough to crush both the pug and the young lady. Next came Mr. Gregson into the arena with his whip of scorpions. He told us we had *Debiliata*, *Polycommata* and what not already, and where was the harm in *Blancheata*. It was not very logical perhaps, and might have been funnier had he divided his words and written *De Biliata* and *Poly O'Don*, the latter of which would be an appropriate compliment to the good lady of the O'Connor Don suppose they chance to call her Mary. Then we had the *Entomologist's* review of Mr. Gregson's pamphlet, and Mr. South's List, and the fire burst into flame once more, with noise enough for a volcano. But what does it all amount to? These things have been done before and will be done again. Sometimes nothing is said, sometimes there is a controversy, but it always ends the same way. It reminds me of an anecdote of the late President Lincoln. A noisy fellow was blustering about something or other that he did not approve of. Lincoln waited till he had finished, then said he would tell them a story. A gentleman of his acquaintance had a dog, and whenever the moon was bright the dog was in the habit of going out into the street, and barking. This did not seem much of a story, but as Lincoln said no more the fellow said "yes, Mr. Lincoln, and what else." "Oh! nothing else" replied Lincoln, "the moon took no notice, it shone on just as before." So with nomenclature, when we are not suited we go out and bark, but the working Entomologists who make the discoveries, go on just as before, and name their insects in honour of their friends in bad Latin or worse Greek, just as if no one had barked at all. I was looking over an old volume of the *Entomologist's Annual* the other day. It contained an account of the doings of the year 1866, and among other things was an article on Coleoptera, giving an account of nineteen beetles new to science

that had been discovered that year by British Entomologists. I give the names that had been bestowed on twelve of them, and the Entomologists who had so named them :—

Homalota Saundersi, Rye
 Gyrophæna Poweri, Crotch
 Lathrobrum Jansoni, Crotch
 Stenus Shepherdi, Crotch
 Lesteva Sharpi, Rye
 Cryptophagus Waterhousei, Rye
 Telephonus Darwinianus, Sharp
 Trichopteryx Waterhousii, Matthews
 Trichopteryx Jansoni, Matthews

There was also

Telephorus Scoticus, Rye

of which the writer observes "This insect appears at last to have found a correct local habitation and a name." But worse still, there was *Trichopteryx Saræ*, Matthews, named in honour of Mrs. Matthews, yet no one complained about that, that I know of, as they did when a gentleman called a butterfly *Spilleri* after himself. Thus eleven out of nineteen were named after persons, and the twelfth after a place, leaving only seven with names that *might* be descriptive. Being an Ignoramus I cannot explain why one species is called *Waterhousei* and another *Waterhousii*, while one *i* only serves for the others. No doubt some learned scribe could show that one was wrong, and another that the other was not right, but my point is, that right or wrong, appropriate or inappropriate, these names served to distinguish the species, and what more could any one desire.

Let me suggest a new topic for learned discussion, namely, the inappropriateness of calling both sexes of an insect after either a man or a woman. A miner, evidently a pigeon fancier, took his child to church to be christened. He had not fixed upon a name and the good Curate suggested Benjamin as appropriate. The man liked it, the ceremony was duly performed, but as little Benjamin was being carried down the aisle a thought suddenly struck the parent. Stopping abruptly, he called out to the Curate, "Hey! a say mister, the young squeecker's a lass." The question of sex had been taken for granted or had escaped notice. What was to be done now. The Entomological Law of Priority, was not more unalterable than that of the Church. Once christened always christened, but the Curate dreading the ridicule to which he might be exposed, suggested a way out of the difficulty. He proposed to add "a" to the name, making it *Benjamin*a, which could be done without any erasure in the register. To this the father consented, and

as Benjamina she was carried off. Now Trichopteryx Saræ may be appropriate enough for one sex of the insect in question, but do not our hair splitters see the advantage of at least altering the termination in case of the other sex. Besides, were the termination altered with the sex, we would get rid of all those cabalistic signs that look so astrological in our lists. I could say a great deal more but dread your fiat being "unsuitable," therefore allow me to conclude with

"A little nonsense now and then
Is relished by the wisest men."

EASTER AT HARTFORD.

BY F. N. PIERCE AND G. H. HARKER.

Read before the Lancashire and Cheshire Entomological Society, April 27th, 1885.

When Easter falls as early as it did this year it does not improve the "takes" of a few days collecting, in fact the generality of people say there is nothing to be got at this time. We, however, have always made a point of working all seasons, so long as the weather is fit for a ramble, though sometimes we have found a great deal more fresh air than insects; but this at any rate is good for our health, and we always say there is something to be taken even when snow is on the ground. This year Easter arrived with fair though cold weather, and continued fine nearly through the week. Thursday, April 2nd, was one of the most glorious days an entomologist could wish for, and it was with high and great expectations that we took the 5 p.m. to Hartford. We had both read of the wonderfully attractive nature of willow flowers, which older entomologists are constantly referring to, and we now hoped that we should have a taste of their quality. It is our belief that the flowers of the dwarf willows that grew on our sand hills are not attractive to moths, for the only thing we have heard of being taken on them is *Tenio-campa gracilis*. This, however, may be due to the large number of willows, compared with the number of insects. When we arrived at Hartford we arranged to pick out a good locality, with plenty of willows, to work that night, but our spirits began to fall as the only willow tree we came across during the long walk from Hartford station, to our cottage just past the "Blue-cap Inn," at Sandiway, was a miserable specimen with about three flowers, only half opened. We then began to remember that willow does not grow very abundantly here, so as we had no time to go searching around that night for more willows, we determined to treacle. This we did as soon as we had had the good tea which our hostess had prepared.

for our coming. However, the night was exceedingly cold and frosty, and we took nothing either at treacle or on the hedges, to which we turned our attention and our lanterns, keeping a good look out for any larvæ, but it was in vain, although we had made up our minds for at least larvæ of *Noctua xanthographa* and *festiva*. Seeing there was nothing to be had we retired to bed, with nothing to set or look after, except one *Diurnea fagella*, which Harker took on the way home. Next morning we were up betimes, and found a thick white mist, and all the country covered with beautiful hoar-frost, which, had the morning been clear would have been a magnificent sight; however, these were minor obstacles, and did not prevent us taking our morning walk if nothing else, so we made our way down the little lane nearly opposite the "Blue-cap," and then across the moss at the bottom, paying very careful attention to the small birch trees on it. We took a few *Diurnea fagella* and one *Dictyopteryx contaminana*, along with a case of *Talaporea pseudo-bombycella*; also several cases of a *Coleophora* on a piece of decaying wood. After breakfast we followed the little stream running from the head of Petty Pool. Mr. Capper had previously told us that here we should be sure to take *Tephrosia biundularia*, but judge our disappointment on finding that some person had been riding Mr. Gladstone's hobby, and that large portions of the banks were entirely cleared of trees, while other trees had the mark of doom upon them. However, we examined very diligently what were left, and when we had reached the lake anxiously compared notes. Pierce's takings consisted of one *Anisopteryx æscularia*, and one *Hibernia progemma*, which flew off the tree as he approached, and gave him a full ten minutes hard work, climbing up and down the sloping banks of the stream before he could secure it. Harker had taken one *D. fagella*, a *Tinea* which he has not yet succeeded in naming, a number of *Coleophora* cases on reed heads, probably *C. cæspititella*, and two on the bark of a fir tree: but where were the *T. biundularia*? That was the question. We certainly determined in our own minds that there were none on the trees we had examined, and lamented that we had no one like Messrs. Capper, Cooke, or Greening to show us how *they used* to take them. When we arrived at the lake Pierce said "now this is the place in which Mr. Capper said we ought to see *Euphrosyne*." He had scarcely got the words out of his mouth when we both exclaimed "What's that!" but, although we ran heedless of everything in the shape of holes and bog we lost the butterfly, but agreed that it was no other than *Argynnis euphrosyne*. We then waited about the spot for a long time hoping it would return, but it did not do so while we were there. Still our chase was not altogether fruitless, for we found some mallards in bloom in the bog at the top of the lake, and, although they

were not half out they were the best we had seen, and we arranged to try our luck at them in the evening, though to get to where they were growing it was necessary to walk through a marsh that took us nearly up to the ankles in water. We, however, did not see the real difficulty till evening arrived, for after we had treaced all the trees down from the lodge gates, had our sticks, lanterns, and beating-sheet ready, and had got over into the plantation, we found or rather could not find a single sallow which was in flower. The darkness, the number of trees, and the water squirting through our boots at every step, made matters anything but pleasant, so we were obliged to leave the sallows to the moths, if there were any, and turn to the treacle. We found on examining the trunks of the trees that there were specimens of *D. fagella*. We were very anxious to get a female, which reminds one more of a beetle than a moth. Harker was the first to discover one, he found a tree on which were several males, and while boxing them found a pair in copula, and then Pierce found one. We counted ten males on the tree and the one female which was by itself, but we found no more. We each netted one *Larentia multistrigaria*, and Harker also a *H. progemmaria*. The treacle yielded nothing whatever. The next day we determined to spend at Oakmere, and on our way there Harker took two *L. multistrigaria*, at rest on some palings, and two Tortrices of which we did not know the name, and Pierce was lucky enough to get two female *progemmaria*, which were wedged in the bark of trees, also another *A. æscularia*. We found a large female willow tree well out in bloom, which was attracting a few bees, and as it was attracting bees, we did not see why it should not attract moths at night, so, towards evening we made our way to it, but, although we beat it into a sheet not a trace of a moth was to be seen. On the way home Harker was fortunate in getting another female *fagella*, and ten more cases of *T. pseudo-bombycella*, every one of which on further examination proved to be of last year and empty. The next day we paid a visit to the "Devil's Kitchen," which is a part of Delamere Forest. This was by far the prettiest place we had seen; it was very picturesque, and the ground was covered with whinberry bushes. Here we discovered that by shaking the oak trees *Tortricoides hyemana* would fly off in the sunshine, and catching them was quite a little excitement. We soon had as many as we could conveniently do with, as we had determined to set all our captures every time we came home; arriving there we would put them in the killing bottle, have our meal, and proceed to set them out. This plan gave us very little trouble and saved a great deal of time, as the insects were quite fresh and had not had time to stiffen, for, as those who use cyanide know, if moths are left in long they are not fit to set for two days. In the evening we searched a hedge where Pierce had a month before

taken some very nice *L. multistrigaria*, but we were evidently late, for we were not successful in taking anything, although Harker saw a *multistrigaria*, several *progemmaria* and one *cesularia* sitting on the hedges, which, however, took flight as soon as the light of the lamp was turned on them. In the evening our hostess brought us a living specimen of *Alucita hexadactyla*, which she had taken in the house. Monday being too wet to do much collecting we went to see one of the salt mines at Northwich, and on our way there we saw a public-house all screwed together, and being bodily lifted up five or six feet; this we afterwards heard is quite a common occurrence, in fact the houses are built for the special purpose on frames, and have to be raised every six or seven years on account of the salt being washed away beneath them, which loosens the ground and causes a sinking of the foundation. We were disappointed with the mine on account of it being so dark; had we seen it when illuminated there is no doubt it would have been a grand sight, as everywhere the salt rock has crystalline surfaces which reflect the light, but with one candle apiece we did not make a great illumination. The men who work these mines are nearly naked, their covering being a thin pair of drawers, stockings, boots, and cap. It was exceedingly interesting to see the blasting and different ways of working. This ended our collecting excursion, for the evening of Monday was wet, and we took nothing. Although we found swallow a delusion and treacle a fraud, considering the time of the year and the backwardness of the season we think we had no reason to be disappointed with our excursion to Hartford.

Liverpool, 24th April, 1885.

THE SMOOTH SNAKE,

Coronella levis.

By W. H. WARNER.

THE boggy parts of the Hampshire heaths have the honour of being the favourite habitat of a species of snake, which till within the last thirty years or so escaped the notice of our British naturalists. The first mention made of the smooth snake as a British species is in Sowerby's Miscellany, where a snake taken in Dumfries in Scotland many years ago by a Mr. J. W. Simmons is figured, described and named *Coluber Dumfriensis*. Without doubt this was a specimen of the smooth snake. In June, 1854 a specimen of *levis* was taken by Mr. Frederick Bond at St. Leonard's, near Ringwood in the New Forest, but its capture was not made public till 1859, in which year the Honourable Arthur Russell sent a specimen of the female to the

British Museum, which had been taken near the flag-staff at Bournemouth. In 1862 the smooth snake again turned up, and several specimens were taken in various parts of the country. In 1872 it once more attracted the attention of British naturalists, specimens having been procured both in Hants and Dorset.

The favourite haunts of the smooth snake seem to be the damp and low-lying parts of heaths and woods. It has occurred in the following English counties:—Devon, Dorset, Hants, Kent, Surrey and Sussex. It is, I believe, the opinion of most of our naturalists who take an interest in reptiles that the smooth snake is by no means rare, but that it has been mistaken for the little red variety of the viper or adder (*Pelias berus*). For the means of distinction between this and other British snakes the reader will please to refer to the end of the paper.

In appearance the smooth snake is somewhat striking. That accomplished naturalist, the late Frank Buckland, thus speaks of one which he had in his possession:—"The head is, strange to say, highly iridescent, shining in the sun like brightest dark emerald coloured velvet; the scales are as slippery as polished horn; the eye small and very bright; the general appearance very like the head of a lizard."

The food of this species consists almost entirely of the nimble little scaly lizards (*Zootoca vivipara*) so common on furzy heaths. To retain these little wrigglers, it has a fang at the hinder end of the jaws. The possession of this fang is one means by which *Coronella lævis* may be distinguished from the common snake. According to a communication addressed to the "Field" newspaper by the late Mr. Edward Newman, this snake when in captivity generally takes the lizard by the tail, which latter appendage immediately snaps off, and is swallowed by the snake, who then retires to digest the morsel, leaving its tail-less victim unmolested for the present.

This species drinks a great deal of water and is said by Dr. Gunther to crawl up the furze and low bushes to lick the rain and dew of the leaves.

The smooth snake although perfectly harmless and destitute of poison fangs has yet a very menacing manner when interfered with. One met with in Dorsetshire in 1872 on being "disturbed quickly approached the intruder, with head erect, and tongue rapidly moving in and out, putting on a very defiant look." Mr. Buckland says:—"When first caught the temper is decidedly bad, for my 'lady'" (a pet smooth snake in his possession) "turned round and fastened on to my hand. I knew very well she had no poison fangs or the experiment would have been dangerous."

The smooth snake is a viviparous reptile, producing at the end of the summer several perfectly grown young ones. We will again borrow from

Mr. Buckland :—"I took the greatest care of my new pet and it was lucky I did so. In a few days it was discovered that my new snake had increased her species, for five young ones were found in the cage with her. Three of these are now alive and have grown considerably. They are very pretty little things and have shining iridescent heads like their mother, towards whom, strange to say, they most decidedly show an affection and liking, being never found many inches away from her side."

The following is a description of the Smooth Snake :—It is small, seldom reaching two feet in length. Above, it is of a brownish or rather greenish brown colour, spotted like the common snake with black, that is with two rows of black spots parallel to each other. The lower parts are lighter and sometimes thickly marked and spotted with black. The smooth snake may easily be distinguished from the other British snakes by the perfect smoothness of its scales. From the common snake it may be easily known too by the absence of the bright yellow spots behind the head, and from the viper by its not having the zig-zag dark stripe down the back.

Standlake, Witney, Oxon.

ON THE VARIATION OF SPECIES.

By C. W. DALE.

In the First Volume of the *Entomological Magazine* (1833), concerning the genus GNOPHOS, formerly CHARISSA, my father writes—"I have taken *C. serotinaria* on a chalk soil, as in the Isle of Wight for instance, and always whitish; *C. pullaria*, on stony chalk at Dover, is rather darker; and another variety on Portland stone darker still, besides a variety at Monk's Wood which appears intermediate. I have taken *C. dilucidaria* at Teignmouth, between grass land and heath, and one very nearly allied on the Mendip Hills, out of furze and on old walls. *C. obscuraria*, which I have taken on Parley Heath, is very dark indeed. Is it not possible that all these are one species?"—J. C. DALE.

From this communication we may conclude that dark varieties occur on cold wet lands, and the light ones on light dry soils which absorb a greater amount of heat from the rays of the sun. In the transactions of the Entomological Society of London, 1882, page 503, Mr. George Lewin says, "What we call bright colour does not exist in obscurity, light is necessary to appreciate it, and is, I think, the factor which produces it, and that nocturnal insects are black because they are not affected by direct rays from the sun."

Chalk districts seem as a rule to be inhabited by insects of a bright light

colour, such as *Arge Galathea*, *Lycæna Corydon*, *L. Adonis*, and numbers of *Geometræ*, in which a clear chalky white takes a prominent place. *Pieris Daplidice* is much more brilliant in colour in the south of France than in England or Sweden. In the Isle of Portland *Larentia olivata* is of a much lighter shade than usual, and in hot summer weather yellowish examples of *Pieris rapæ* are of frequent occurrence.

Boarmia repandaria, in England, frequents trees, and when at rest its colour assimilates to that of their trunk; but in the Outer Hebrides, where there are naturally no trees to rest on, the insect has become differentiated to the colour of the gneiss rock.

Those species whose larvæ feed on lichens, and are often found in orchards, are invariably of a green colour, such as *Bryophila perla*, *B. glandifera*, *Cleora lichenaria*, *Leptogramma literana*, *Gracillaria sulphurella*, &c. The species, I believe, vary from a darker to a lighter shade, according to the situation of the lichens. Plants possessed of resinous or rather strong vegetable properties may be said in general to produce dark or reddish-brown moths, such as *Trachea piniperda*, *Boarmia abietaria*, *B. cinctaria*, and the genera *Thera* and *Retinia*. Most of the marsh moths, and those whose larvæ feed on reed and other plants growing in water, are either of a white or straw colour. Take for instance the genera *Nonagria*, *Leucania*, and *Chilo*, and also *Macrogaster arundinis*, and the *Hydrocampidæ*.

No better illustration of the assimilation in colour, of the larva to its food plant can be found, than in that of *Pterophorus galactodactylus*. It feeds on the leaves of the burdock, always being found on the underside, and is frequently overlooked by the inexperienced eye.

Melanic varieties occur very commonly in Ireland, Isle of Man, Scotland, Durham, South Lancashire, and the West Riding of Yorkshire. The New Forest is also prone to produce melanic forms, where the soil is in places extremely dark coloured, induced, doubtless, by the abundance of astringent vegetable matter, tannic or other acid, which through the annual decay of large quantities of oak, common bracken, and heath, is set free, and washed into a soil charged with iron, and producing an inky blackness of earth. The localities where we find melanism most pronounced, viz. Yorkshire, Lancashire, and Durham, are all manufacturing districts, where immense volumes of smoke are constantly given off from furnaces and coal pits, covering more or less the whole of the vegetation with a fuliginous deposit, giving to large tracts the name of the black country.

Species of Lepidoptera which occur during the dark winter months are invariably of a dark colour, as *Pæcilocampa populi*, *Expate gelatella*, &c.

Satyrus davus is of a far lighter shade in the Shetland Isles than on the

peaty mosses of Lancashire ; owing to vegetation in the Shetland Isles being of a more scanty nature the pupæ are probably more exposed to the action of the sun. Look for instance at *Satyrus Janira*, of which white and light brown varieties frequently occur in the north of England, caused more or less by the action of the sun on the pupæ, shortly before the emergence of the imago. Of those species which are double-brooded, the spring brood is generally the larger and darker. The genus *Selenia* is a good illustration of this, as well as the female of *Lycæna Argiolus*.

Glanville Wootton, Sherburn, Dorset.

To be continued.

BRITISH BUTTERFLIES, THEIR DECREASE AND ITS CAUSES.

By FRANK G. PRESCOTT DECIE.

IN the March number of the *Young Naturalist* for the present year is an extremely interesting article by Mr. J. E. Robson, entitled "Are Butterflies disappearing from the British Isles?" With most of the statements made in that article I quite agree, but I cannot, on the present evidence, admit the correctness of the two main conclusions to which Mr. Robson comes in the course of it ; without modifications, in the one case slight, but in the other considerable. It is with no small amount of diffidence that I venture to express an opinion adverse to that of Mr. Robson on such a subject, for my own entomological experiences extend over only a very few years, and I must, moreover plead guilty to being unacquainted with the larvæ of so common a species as the Meadow Brown. My hope, however, is that I may by what I am now writing, induce Mr. Robson, at some future time to bring to the knowledge of the readers of the *Young Naturalist* some more of the data which assist him in arriving at these conclusions.

In the first place, then, Mr. Robson would have us believe that "unless our climate changes, and it is not likely to do so in any perceptible degree, we may expect the British Butterflies to become fewer and fewer in number, and perhaps eventually to disappear altogether, and, that the time is not very far distant, when a large portion of our butterflies will have ceased to exist as natives, and the collector of that day may only expect to fill his series by the chance occurrence of immigrants, or from foreign examples." In arriving at this conclusion Mr. Robson seems to start from the following premises :—

(I.) Of the butterflies upon our existing lists "one at least is already extinct, several are only keeping on our lists by immigration, and a still larger number, while common where they occur, are disappearing from extensive districts, and not again spreading over them."

(II.) "The earlier writers on entomology mention a considerable number of species as natives of Britain, that are not now to be found."

(III.) Nothing like the same proportion of species in other groups are becoming rare or extinct. "A few species may have done so, but none that were even generally abundant, and in every (other?) group the new additions to our fauna have far exceeded those that have disappeared or become rare."

(IV.) Comparing the whole number of species of the larger Lepidoptera found in the Palæarctic region with the number of British species, we find "that in proportion to the other groups (except Burnets) either singly or or together, we have less than half the number of butterflies that we ought to have."

The fourth of these statements may, I think, be very shortly dismissed from our consideration, for though I believe it to be perfectly true, I do not think any deduction, such as Mr. Robson would draw, can be legitimately drawn from it. Of course if it were certain, or even probable, that we originally started with a number of species of butterflies only less than the total number of Palæarctic species, in proportion as the number of our species of larger Heterocera are less than the total number of Palæarctic species, Mr. Robson's table would be cogent evidence that our butterflies had already very considerably diminished in number. But surely it is far more likely that there was once a time when the species of butterflies over the whole of the Palæarctic region was very small, that from these few species the others were developed, and that this developement of species was more rapid and extended where the conditions were more suited to sun lovers. That the table, in fact, is no proof of decrease of species in our Islands, but only of less increase.

With regard to the third premise, I would remark that it is hardly fair to lay any stress on the fact that in every group of Lepidoptera, except the butterflies, "the new additions to our fauna have far exceeded those that have disappeared or become rare," for this is, of course, explained by the fact that the butterflies are so much more conspicuous than the other groups. As to the rest of the premise, it is a question of fact as to which Mr. Robson is far better able to judge than I am.

With regard to the second premise I think Mr. Robson takes rather an extreme view, and I do not consider that it has all the significance which he appears to attach to it. Some of the old records may be trustworthy, but

the attempts that have been made to explain them away, have in most cases met with no small amount of success.

The statement in the first premise that "several species are only keeping on our lists by immigration," is surely irrelevant to Mr. Robson's inquiry. To make it relevant it would be necessary to show that at some time or other these species were true natives of the British Isles, and I cannot find that Mr. Robson adduces a shadow of proof that any of them ever were so. The remainder of the premise is, of course most material, though I cannot help thinking it somewhat over strongly stated.

The modifications which I have considered it necessary it to make in Mr. Robson's premises, force me to come to a conclusion somewhat different from his. In my opinion though there is certainly a process of extinction of our butterflies going on, owing to causes which I shall presently attempt to explain. Yet this process is one of such a very gradual nature, that the time is still exceedingly "far distant when a large proportion of our butterflies will have ceased to exist as natives." There is at the present time an indication among entomologists to exaggerate the number of "disappearances" of butterflies, owing to the fact that the wet years we have had lately have temporarily greatly reduced the number of specimens of almost all the species of our British butterflies. But these wet years can be no new experience to them. They must have weathered a succession of bad years before, and I confidently expect to see them reappear after a few fine summers, in numbers but slightly diminished. Only before the growth of our towns, and the all-destroying smoke of our factories, will the greater number of our species absolutely die out.

The second of the two main conclusions to which I referred, is that the causes of the diminution of the numbers of our butterflies, are "our mild open winters, cold ungenial springs, rainy and sunless summers." I do not know whether the mild open winters, and so on, are intended to typify the climate of England under ordinary circumstances, or the peculiarly unfavourable weather which we have been experiencing of late years. If the former, I do not think that had more than a very slight influence upon the decrease of the numbers of our butterflies; if the latter, I would remark that a species whose disappearance only dates from '77 or '78 has not been gone long enough to make it at all improbable that with fine weather it will reappear. The main cause of all permanent disappearances of our butterflies is not the climate but man, and that I shall presently endeavour to show. There is another matter which, in the opinion of at least one of our leading lepidopterists, is likely to exercise, if it is not already exercising, an unfavourable influence upon the numbers of our British butterflies, and that is the large

increase in the number of our birds, which has been going on since the passing of the "Wild Birds Preservation Act." I do not know whether this increase has been taking place everywhere, but it has been most marked here (on the borders of Herefordshire and Worcestershire.) In support of the assumption that it is chiefly our climate that is causing the number of our butterflies to decrease, Mr. Robson refers once more to the comparative table of Palearctic and British Lepidoptera, which table, he says, affords a strong proof that such assumption is correct. From what I have already said it will be evident that, in my opinion, far from affording strong, it does not even afford evidence of any kind that such is the case.

On p.p. 60-62 Mr. Robson gives a list of the species of butterflies which he thinks it most important to consider in connection with this question at the head of his article, together with a number of interesting remarks. This list and these remarks I have found of great assistance in enabling me to give some idea of what I mean, when I say that man is the chief cause in the diminution of our butterflies. Mr. Robson divides the species into five classes. As to two of these species, viz., II. and III., containing respectively "Immigrants that do not breed here," and "Immigrants that breed here, but seem unable to perpetuate their race," I have already sufficiently clearly indicated my opinion that they have no real bearing upon the subject of the present article, and I will consequently confine my attention to the other three.

I. EXTINCT (1.)

In this class is one, and only one, species, and that this was destroyed by man is, I think, abundantly clear. This species, *Polyommatus hippothoe*, was, so far as we know, always a fen insect, and the chief (I do not know whether they were the only) food plants of the larva were the dock and the great water dock. The fen drainer consequently dealt this species a severe blow, but it was left for the greed of collectors to give it the finishing touch. Within the last twenty years, says Professor Westwood in an edition of his *British Butterflies*, published 1860, "the insect has become common in collections, owing to the immense number taken by collectors in the former localities" (*i.e.* Cambridgeshire and Huntingdonshire) "which, together with the drainage of the fens, as I understand has almost extirpated the species." Since that time it has quite extirpated the species. The fen drainer, I take it, restricted the range of the insect to a comparatively small space, and once its range was so restricted it had no chance against the onslaught of greedy collectors. Surely the hand of man is seen plain enough here.

IV. SPECIES THAT ARE RAPIDLY DISAPPEARING. (3.)

1. *LYCÆNA ACIS*.—This species, Mr. Robson tells us, "has long been

one of our rarest natives." The supposition, therefore, is that its *rapid* disappearance has only lately begun, otherwise it would long e'er this have entirely disappeared. Consequently it is hard to believe that the climate, which has for this last thousand years, at least, remained partially unchanged, can have been the cause of it. At all events the climate can hardly be held directly responsible for its disappearance from fields at Penarth, near Cardiff, which are now built over.

2. *LYCÆNA ARION*.—I have looked through the account of the partial disappearance of this butterfly in the last volume of the E. M. M., and I find that from a locality at Bolthead where it was once found it has definitely disappeared. The reason of this disappearance is not far to seek, and we have no need to fall back upon the climate. Man has changed the whole of the face of the spot where the insect was formerly found, and by his innovation has made it no longer a fit habitat for the species. The remainder of the notes point to the fact that in many of its old localities the species has not been seen since '77. But inasmuch as it still exists in Devonshire, and its range widens or contracts according as the summers are fine or the reverse, we may confidently expect that in the next few summers, which it is generally admitted are likely to be propitious, it will once more spread over many of its old haunts, as it seems to have spread over the Cotswolds during the years between '66 and '70.

3. *Thecla Pruni*.—I do not personally know anything about this species. Mr. Robson himself seems rather uncertain to its right to the place which he gives it in this class, and I should like to know on what evidence he has given it this place.

V. SPECIES WHOSE RANGE IS BECOMING RESTRICTED (11.)

The heading of this class points to a fact which, I think, tells not a little in favour of my contention, a fact pointed out by Mr. Robson on page 62, when he says the species in this and the preceding class "which, common where they occur, are disappearing from extensive tracts, and not again spreading over them." I do not, of course, mean to say that I agree with any such sweeping statement as that which Mr. Robson makes there, but the fact to which I refer lies embedded in that statement, and is this :—When a species of butterfly begins to disappear, it does not do so by becoming rarer all over the country; but, while it remains in some places as numerous as ever, in others it suddenly becomes scarce, or absolutely extinct, and this, although all the places may be exposed to the same atmospheric influences. This is not at all what we should expect if the disappearance was caused by the influence of climate. Some other deeper cause must be looked for, a

cause, which will hardly ever be found to be the same in any two cases, a cause which, in all probability it will be no easy matter to discover. It is really a most unfortunate thing that, with regard to all the species falling under this important head, Mr. Robson has made his remarks "as brief as possible." So brief, indeed, are they, and to such a small extent do they support the meagre information to be found in the books, that I am unable even to guess at the causes of the alleged disappearances of many of the species. This is notably the case with *P. crategi*, *A. aglaia*, *S. aegeria*, *C. pamphilus*, *L. alsus*, and *P. phlæas*. I can only hope that on some future occasion Mr. Robson may find an opportunity to tell us something more about these butterflies. As to the few remaining species I would like to say a few more words:—

1. **PAPILIO MACHAON.**—This species has certainly a range very much more restricted than that which it once had. I am unable to suggest any probable cause for its now confining itself to the fens, but I think Mr. Robson will find it hard to show that its limited range is the effect of the malignant influence of climate, at all events its disappearance from its old haunts in the suburbs of London is easily explained, man the collector, and man the builder have exterminated it or driven it away. Some of its old haunts are now entirely built over, and in the others a conspicuous and handsome insect like *Machaon* would soon be made an end of by the crowds of little boys and entomologists (so-called), who are always ready about to catch and kill everything, whether they really want it or no.

2. **VANESSA C-ALBUM.**—Here, again, climate has had little or no influence. What is the cause of this species now confining itself to the hop-growing counties I cannot say, but I should think that its reported present scarcity in Kent is produced by the increase of hop washing in that county. Here the hops are washed comparatively little, and though the insect is, as it always has been, very variable in its numbers from year to year, it shows no signs of permanent decrease; it is a marvel to me that it does not do so, for the destruction of pupæ that takes place during the hop picking season every year is simply appalling. I do not understand how any escape. Escape, however, some certainly do, and the wonderful vitality and fecundity of the species enable it to remain tolerably numerous.

3. **M. ARTEMIS.**—I think that I shall be able to show that in most cases, at all events, the disappearance of this species is caused by man, and in this part of the country bad seasons have been positively beneficial to it. The larva feeds principally (I believe here exclusively) upon the Devil's-bit Scabious. Where a good system of drainage and tolerably good farming are

to be found, this weed exists only in small quantities, and, as a consequence, *Artemis* is scarce and perhaps non-existent. Should, however, anything cause the Scabious to become more plentiful *Artemis* in all probability reappears. Here, *Artemis* was almost unknown for some years prior to '83. The bad seasons we had before that year, and the lack of stock in the country, produced by the consequent impoverishment of the farmers, had by that time caused the fields to become very rough, and the Scabious plentiful, and *Artemis* definitely established itself in a few fields that year, and where it was found it was in considerable numbers. Last year its range had considerably widened, and the larvæ were extremely numerous in several rough fields, at wide distances from each other. Unfortunately it was very cold about the time that the imagines should have emerged, and their number was by no means proportionate with the number of larvæ seen. There were, however, I hope, enough to ensure a good show this year if the weather be propitious.

4. *L. ARGOLUS*.—Without having some more definite information as to the diminution of the numbers of this species, I cannot hope to give any satisfactory explanation of the causes of that diminution. Perhaps, however, the insect is only changing its localities. At all events, after the species had been many years absent, a specimen made its appearance here in '82, and was followed by several more in '83, while in '84 the species had become sufficiently plentiful to be marked as "numerous" in our list for that year.

It will be seen from what I have said about the species named above, that wherever I am able to give an explanation of the causes of their disappearance, the chief of those causes is man. Unfortunately these explanations are very few in number. There is one other point to which I should like to call attention, and that is the suggestion which Mr. Robson makes quite at the end of his article, that the cutting down of our forests has had a prejudicial effect upon the number of our butterflies. This I think is certainly a valuable suggestion, so many of our butterflies being lovers of woodlands, and it is one about which I hope we shall hear more.

In conclusion, I would repeat that the points which I have endeavoured to prove are—first, that although the number of our butterflies is undoubtedly diminishing, that diminution is hardly so great as people would lead us to think at present, and there is no fear that many of our species will be extinct in anything like the immediate future; and secondly, that the chief causes of all permanent disappearances of our butterflies is man, whose influence far exceeds that of climate or anything else. And I will also repeat Mr. Robson's hope that further reports on butterflies will be furnished by many readers of the *Young Naturalist*, adding, however, this remark, that reports

sent by those who have kept careful diaries, are worth incalculably more than those who depend upon memory, or casual notes for their information, inasmuch as accurate dates and localities and tolerably accurate numbers are absolutely essential. Let no one be afraid of writing too much at length about any species. What is wanted is a mass of accurate and somewhat minute information, from which to deduce conclusions, and the more of this information there is forthcoming the better.

Bockleton Court, Tenbury.

GEOLOGICAL NOTES.

By JOHN DALE, F.R. Met. S.

Of all the Geological formations, from the Laurentian to the Post Tertiary, sedimentary constitute the greater part; if we include the metamorphic rocks, which were, no doubt, sedimentary, we shall find that fully nine-tenths of all the rocks which are exposed on the earth's surface may be called sedimentary. The mineral character, structure, and origin of these rocks have not received that attention and investigation which their importance and magnitude demand, many of our text books being lamentably deficient in clear and intelligent descriptions of them.

In Lyell's "Student's Elements of Geology" we find five chapters, extending over eighty pages, devoted to a description of the mineral character, structure, and origin of igneous rocks, while the same features in the sedimentary rocks, apart from the fossils they contain, do not occupy more than one-third of that space. In Rutley's "Study of the Rocks" we find about the same proportion of space; in the second part of the book on Descriptive Petrology, igneous rocks take up one hundred pages, while sedimentary rocks are dismissed in thirty pages. More attention, however, has been given to the latter class of rocks in Geikie's "Text Book of Geology," and any attempt to extend our present limited knowledge of the character and origin of sedimentary rocks, we believe to be worthy of commendation.

Any tyro in Geology knows that the bulk of the sedimentary rocks may be divided, according to their mineral character, into three groups, viz.: the argillaceous, the calcareous, and the arenaceous—or clays, limestones, and sandstones; but the relation of these groups one to another is not so clearly seen or understood, and it is with the intention of elucidating, this that the present article has been written.

Professor Hull, in the Quarterly Journal of the Geological Society, Vol. XVIII, has very clearly pointed out the mutual relation of these groups to each other. He shows that the calcareous strata are essentially of organic origin, and the other sedimentary rocks are essentially of mechanical origin, and that the former may be regarded as occupying neutral ground between the areas of dispersion of the latter series. He proves that life in the sea cannot be so abundant when the water is loaded with sedimentary matter as when it is comparatively clear, and hence he concludes that the sedimentary materials from the disintegration of the land prevents the formation of limestone. Now as long as the earth's surface at any particular locality remains quiescent, that is, does not undergo either upheaval or depression, the areas of deposition will remain relatively the same in the three great groups; but when an upheaval takes place, the arenaceous or argillaceous area will encroach upon the calcareous area, and when subsidence occurs the reverse is likely to be the case.

As there are marine formations of all ages, and the most rational idea of a geological period would suppose it to have begun with a change in the land surface, as well as in the fauna and flora, and to have ended with another change. Professor Hull thinks we may regard each complete geological formation as consisting of argillaceous and arenaceous deposits in its earlier and later stages, with calcareous deposits near the middle of the period. Bearing this in mind, it may be interesting to notice how many formations would seem to confirm the views of Professor Hull by having this tendency to a threefold division with calcareous deposits in the central position.

In the Cambrian and pre-Cambrian rocks which have been very much disturbed and metamorphosed, we cannot distinctly mark this arrangement; but in the Upper Silurian we find this threefold division very clearly defined in the Wenlock and Ludlow formations.

In the Devonian of Devon and Cornwall we find the middle group consisting largely of limestone, while the upper and lower divisions consists mainly of sandstones and slates.

The Carboniferous system is distinguished by the thickness of its limestone, which has its lower limestone shales, and above it the Yoredale shales and sandstones.

The Permian system in the north of England are developed as follows:—

Upper Permian (Sedimentary) 50 to 100 feet.

Middle „ (Calcareous) 600 „

Lower „ (Sedimentary) 100 to 250 „

In the north-west the middle beds have thinned out very considerably, but the three-fold division is maintained throughout.

The Triassic system has been so named because of its three great divisions—Keuper, Muschelkalk, and Bunter; the middle division is calcareous and though absent in Britain, it is well developed on the continent. The same three-fold arrangement may be seen in the Jurrassic system, the limestones of the Lias and the Oolite alternating with clay shales and sandstones.

In the Cretaceous formations we find the chalk marl and the Gault clays underlying the chalk; while in the London basin we see the Thanet sands conformably overlying the chalk, and although these sands belong to the lowest of the Tertiary formations, still as it lies conformably upon the chalk, and completes the three-fold series of argillaceous, calcareous, and arenaceous strata in the usual order of superposition, we are quite justified in taking it as an illustration.

Throughout the Tertiary group this three-fold arrangement of strata cannot be so clearly traced, the areas of upheaval and depression are more limited, the changes were not so great, and the movements seem to have taken place in a more irregular and spasmodic manner, hence the results are not so manifest as they are in most of the older formations already mentioned.

This three-fold division clearly indicates three periods in the history of the earth:—the first, a period of depression; the second, a period of quiescence; and the third, a period of upheaval: or 1, movement; 2, rest; 3, movement.

We have pointed out that the lower strata are more generally argillaceous, this is especially the case in the Oolite and the Cretaceous formations; this is probably due to the wearing down of alluvial shores and cliffs, as the land slowly subsided beneath the waters of the ocean.

Most of the organisms that produce limestone can only exist in deep, clear water, which is free from mud or sand, and hence we never find limestone as a primary deposit in any formation, it generally occurs near the middle, or during the time of quiescence.

Arenaceous deposits are generally produced by the degradation of granite or other plutonic rocks, and also the denudation of indurated grits and sandstones, such as would be likely to come to the surface after a period of great and extensive upheaval.

May we not thus read in the mineral character, and in the natural arrangement of sedimentary rocks, apart from the fossils they contain, the history of the geological changes which have taken place in the earth's crust.

THE LEPIDOPTERA OF LONDON.

By ERNEST ANDERSON.

(Continued from page 107.)

The next of our town series is *Zeuzera aesculi*, commonly known as the Leopard Moth, Wood Leopard, or Miller. It may frequently be taken on the trunks of the trees in which it has passed its larval state. Ash trees and fruit trees being especial favourites with it, and I have also sometimes observed these moths upon a still summers evening slowly and apparently labouriously pursuing their wheeling flight round and round the top of some lofty tree. The female has a very large body and deposits a great quantity of ova, which are of a pinkish colour, and do not hatch for many months. This species occurs all over London, Victoria Park, and the neighbourhood of Dalston, being well-known spots for it, but like many other species it is most often seen by those entomologists who "Shake off dull sloth and early rise" to pursue their favourite study. Another well-known and destructive inhabitant of our parks and gardens is *Cossus ligniperda* (the Goat Moth), its ravages being only too apparent in many places, feeding as they do in the trunks, forming long winding galleries in the heart of the wood, and remaining for three years in the larval state—they may well be considered destructive inhabitants—though it is only fair to say that some authors assert that they only attack those trees which are already diseased. These larvæ are called by some people "Raw beefs," they emit a very unpleasant odour, which cannot be got rid of for some time after handling them—and indeed is very frequently a clue to their presence—which would not otherwise be detected.

The Ghost Moth (*H. humuli*), up to a very recent time, was found in the churchyard of South Hackney church, a very appropriate situation,—it is now, however, extinct there, and it is doubtful whether it occurs anywhere in London—though on the marshes it is very abundant. But the next species on our list, *N. cuculatella*, occurs in great profusion on some of the white-thorn trees and hedges in our parks, the little larvæ swarming during June, and the moths being observed on every paling in July. The mode in which these sluggish little larvæ construct their boat-shaped cocoons is very interesting and well worth observation.

From this inconspicuous little species we proceed to the gaudy *Arctia caja*, a species well known to almost every one, more especially in the larval state, the caterpillar being known as the "woolly bear." They first appear toward the end of March, having hybernated, and seem to feed upon every low plant to be found. They are at first very small, but quickly attain a large size, and towards the end of May they are frequently observed travelling

at a great pace along the paths in our gardens, in search of a suitable place in which to form their sticky cocoons. The moths are much less frequently seen, they, however, sometimes fly into open windows at night time, and are also to be found on lawns, &c., at daybreak, being then very conspicuous, but as the sun rises they crawl away and hide themselves, amid the thick grass or herbage until the evening. Owing to the extraordinary variation which occasionally takes place in specimens of this species, it is a favourite one to rear with collectors, and many are the methods to obtain a "Black Tiger." It is indeed somewhat curious that the insect should maintain its vivid colors amid such smoky surroundings. My own experience makes me think that the dark varieties are really caused through ill-health, insomuch as most of those which emerge are cripples. I once reared one which was almost jet-black, but, unfortunately, the wings were crinkled and ribbed, in the manner known too well by most lepidopterists.

Sesia tipuliformis after mining our currant twigs throughout the winter in the shape of a white maggot, emerges during June and July, and is found basking on currant trees up some sunny wall. *S. myopiformis* is also occasionally to be found in the vicinity of apple or pear trees, a specimen was captured last year in Haggerston, and I think that it would be observed much more frequently in London, if carefully looked after by those who have fruit trees near them. *S. cynipiformis*, I believe, still exists in Hyde Park, on the old oaks at the back of the powder magazine, but in these days of dynamite, any attempt on the part of an entomologist to visit these trees is met with active remonstrance on the part of the sentry on duty.

Perhaps the Buff Ermine (*Arctia lubricepeda*) and White Ermine (*Arctia menthastri*), are amongst the most familiar of our town species, the perfect insects being commonly observed at rest on fences, door-posts, &c., during the summer, and the larvæ always appear in great profusion during the autumn, feeding on almost everything growing in our gardens—the tea-tree, Virginia creeper and elder being especial favourites in this district. The extraordinary activity of these larvæ is well worthy of note, and any entomologist having a quantity of them feeding, cannot fail to experience it when engaged in supplying them with fresh food. *Liparis monacha* (the Black Arches) is said to have been taken in London, but I have never seen it myself and hardly credit it breeding here; another of the genus, however, is without doubt a regular inhabitant, this is *Salicis* (the Satin moth), which a few years ago was exceedingly abundant and is still fairly common, the larvæ feeding upon various kinds of poplar. When young these larvæ appear to be gregarious, and the pupæ may frequently be observed spun over each other on one branch; June is the best time to take this species.

Orgyia antiqua.—The merry little Vapourer is one of the most pronounced of our town lepidoptera, the pretty tufted larvæ been seen everywhere through the summer; and the male moth, with his peculiar jerky flight, is a familiar object in our streets during the hot autumn days. Even in the very heart of the city this species continues to flourish, some lime trees in London Wall, and one solitary tree in Crosby Square, being dotted all over with the cocoons. The larvæ, like most viscid and hairy larvæ, are probably distasteful to birds, hence their continued existence in such precarious situations. The apterous female is an interesting object, it hardly ever travels off the cocoon from which it emerges, but concentrates all its energies upon depositing its ovæ in compact order on the outside, thus differing greatly from the apterous females of the genus *Hybernia*, which are very active and travel considerable distances. The origin of these apterous species affords ample subject for thought and reflection, at present, no reasonable theory has been advanced on the question. Were it not for the practice of lopping the lime trees in early spring, this species would swarm even more than at present; a large number of broods are annually destroyed from this cause.

To be continued.

OBITUARY.

NICHOLAS COOKE.

It is with deep regret that we record the death of NICHOLAS COOKE, one of the most indefatigable workers in the North of England, who died on the 19th May. He was on a visit to Mr. Briggs, at Leatherhead, Surrey, where he had gone to show him *E. alpinalis* and *gracilalis*, and suddenly fell back into the arms of an Entomological friend, and in ten minutes he had left us. His remains were brought home and interred in the public cemetery at Liscard, Cheshire, in accordance with the simple but touching fashion of the Society of Friends. In the presence of a large concourse of sorrowing friends the coffin was placed on stretchers, beside the open grave. Perfect silence reigned while each communed with his own heart, and thanked the Giver of all good for his many mercies. Then without one word the body was lowered to its resting place, and after a brief space all moved away to the chapel, which was quite filled with sorrowing relatives and sympathising friends, all bowed down with grief. Silence reigned for a time, then a venerable old man rose and addressed the assembly in a broken voice. He was the oldest brother of the deceased, and he spoke impressively of the true Christian

spirit in which his brother had lived and died. Again silence, then rang out in clear and impressive tones "Be ye also ready," and in this theme a young man addressed the company in solemn and suitable terms, concluding with a repetition of the words "Be ye also ready." Other addresses followed, then all was over. I have enlarged on the ceremony because many there were deeply impressed, never having been at a "Friends' " funeral before.

Nicholas Cooke was 68 years of age, and had been a hard working Entomologist for nearly 50 years. He was educated at the "Friends' " school, near York, and was one of the last survivors of that band of practical workers who have made the North of England so prominent in Entomological matters. As a discoverer of species "New to Britain," and for finding in the North of England insects that were formerly considered "Southern species," he and brother Benjamin were unrivalled. They commenced their discoveries almost half a century ago, when on a visit to their Uncle Robson, at New Brighton, they discovered near their back garden the now well-known *Nyssia zonaria*. Since then he has been one of the most successful in making similar discoveries, but he has excelled all his compeers in his persistent following up any slight clue to a species not hitherto known to occur in the north, and of which the locality had been lost. (It must be remembered I am writing of a time long before the days of "Weekly Intelligencers," or "Monthly Magazines," and even when correspondence was a slow and costly business.) Thus *Scoliaformis* was re-discovered by him. *Galii* was followed, until the whole coast line from Wallasey to Point of Air had yielded him a rich harvest. *Caniola*, at Howth, was diligently followed up, and on that journey two new Tortrices rewarded him, and near Warrington he found another and a new Gelechia. On Rosley Moss he was one of the first to take *Lithosia sericea*, and *C. imbutata*, then a very rare moth. At Delemere he discovered *C. temerata*, previously exclusively a southern species. When there taking *H. pennaria*, his brother Benjamin took a moth they did not know, he and a friend went "to take some more," sending the first to Mr. Doubleday, at Epping. Word came back "*Cheimatobia boreata*, new to Britain," and in a month they had specimens enough for all their friends. *Carmelita* was taken in Cumberland, the next April found him and two friends on its track, successful as usual. A wing of *Trepida* was found in Petty Pool Wood, and day after day and night after night was spent in its search, until it was no longer rare in our cabinets. *Menyanthidis*, then exceedingly scarce, next took his attention. Its habits were found not to agree with its name, and it was soon made common. One of his friends bred *H. petasitis*, from a very young larva found near Manchester. He was invited to Cooke's house to work for the

pupa, and here his life might have ended, for in his anxiety to get to the lower plants he fell backwards into the water, but this did not prevent a successful day. *Agathina* was taken on Rosley Moor, and Nicholas gave it no rest until it was no longer scarce. Perhaps the greatest excitement among this band of workers was when *A. Ashworthii* was re-discovered at Llanverras. Mr. Ashworth being dead, his locality was unknown to us, and when Nicholas Cooke was shown the ridge of rock it was found upon, he started at 6 a.m. to search for it, and worked twelve hours for it without a break, proving the most successful among us that day; taking also the first *A. lucerneae* known to have occurred in Wales. His next discovery was *Shrankia humidalis*, H.D. (*Hibernicas*, Weaver), the *Turfosalis* of Wock. This he found in the Dog Kennel Wood at Delemere, and was then supposed to be new to Science. One of his most beautiful and interesting additions to our list was *Rhodaria sanguinalis*, discovered flying one June morning at 5 a.m. (who goes collecting so early now-a-days.) In SCOPARIDÆ, he was fortunate in taking in Scotland, at various times, *Gracilalis*, H.D. and *Alpina*, Dale. In CRAMBIDÆ, he took *Ericellus* and *furcatellus* repeatedly. In TORTRICES, we owe to him and his brother the beautiful little *Peronea comparana* (*potentillana*, Cooke), the distinct *O. permutana*, which is confined in this country to the Cheshire side of the Mersey. Another of his interesting Tortrices was *Sericoris Daleana*, H.D. (*Alternana* Steph.) In Tinea he did not do much, but his discovery of *E. Steinkellneriella* on mountain ash, and the cases of *Pseudo-bombycella* on heath and on fir trees at Delamere and of *X. argentimaculella* on lichens in Weaverham lane, gave an impetus to other workers that has had lasting effect. His discovery also of *Tinea merdella* in wool warehouses, set others working to same purpose in produce warehouses. Again his capture of a plume among wild sage set others to give attention to these plants. Mr. Cooke's capture eventually proved new to science, *P. Britaniodactylus*, Gregson (*Teucriti*, Jordan.)

Mr. Cooke was twice President of the Northern Entomological Society, the last time in 1882. He was for several years Vice-president of the Entomological Society of Lancashire and Cheshire. His collections were very large. His European Butterflies were contained in 40 drawers. His grand collection of British Lepidoptera were contained in a cabinet seven feet square! He has bequeathed these to the Mayor, Aldermen, and Burgesses of Liverpool for the free public museum. Some idea of the value of this bequest may be formed when we say it contains full sets of the extinct large Copper *C. Dispar*. A full row of *S. Scoliaformis* (chiefly bred by the writer.) A full series of *A. Ashworthii*, bred; of *Exulis*; of *Nigrocincta*, true Manx bred specimens. But more perhaps may be said of it after it reaches its destination. It con-

tains the combined collections of Noah Greening and Nicholas Cooke, and a selection from that of Edwin Birchall, for which Mr. Cooke paid One Hundred and Fifty Pounds.—C.S.G.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

At the meeting of this society, held 23rd April, Mr. May exhibited a series of *P. unguicula* and one specimen of *E. porata*, bred from larvæ taken in Epping Forest, and Mr. Russell made a donation of several species of *diptera*, and some pupæ cases for the life-history collection. The chief object of interest was a discussion upon the life history of *A. aglaia*, which was introduced by Mr. Sheldon, who gave a very exhaustive account of the species, which he had met with abundantly in Merionethshire, where the specimens were remarkably large and dark, some of the females approaching in colour the var. *valezina* of *A. paphia*. Mr. Harper also contributed much information regarding the species, which he had observed commonly between Deal and Folkestone, and also in the New Forest, where he once took the var. *Charlotta*. Mr. Russell gave his experience of this species in the New Forest, where he had once taken the larva, and the meeting did not terminate till past 11 o'clock.

At the following meeting there was an unusually good attendance, and a great many exhibits, which may be mentioned living specimens of *O. pudibunda* and *P. hamula* by Mr. Harper, a series of *S. illustraria* by Mr. Franklin, and specimens of *N. camelina*, *D. capsicola*, *A. betularia*, *P. meticulosa* and *H. prasinaria* all bred this year by Mr. Russell. Mr. Hockett shewed specimens of *A. aglaia* and *A. adippe* in connection with the discussions, and Mr. Clark arriving in the room at a late hour direct from Chingford, exhibited living specimens of *A. derivata*, *C. suffumata*, *S. illunaria*, *A. badiata*, and mentioned that Mr. Goldthwaite had taken *A. pictaria*, and *L. adustata*.

The meeting of May 7th was chiefly occupied with the discussion of coleoptera, Mr. May exhibiting various species from China and Suez, and Mr. Lewcock shewed a number of plates sent to him by Mr. Gill of the Bath Microscopical Society, the whole of which were most beautifully executed, and excited the greatest admiration. Mr. Lewcock also read some extracts from a paper read by Mr. Gill before the Bath Microscopical Society, in connection with the beautiful lot of plates exhibited by him,

illustrating chiefly the different structure of the mandible and elytræ of the various species of coleoptera. At the close of the meeting a hearty vote of thanks was accorded Mr. Lewcock for his kindness in bringing up the plates and reading the paper.

The meeting of May 14th was devoted to the discussion of the life history of *A. adippe*, the subject being brought forward by Mr. Clark, and continued by Messrs. Hockett, Harper, Sheldon, and Gates, the principal localities mentioned were Box Hill, Leith Hill, Darenth Wood, Lyndhurst Heath, and Brentwood, whilst West Wickham, and Hainault Forest were spoken of as localities where the species was now extinct. Mr. Hockett recorded having observed *A. cardamines* on the 3rd of May, and also several *L. argiolus*, and Mr. Russell gave in reports from Box Hill, West Wickham, Epping Forest, and Deal.—ERNEST ANDERSON, Secretary.

SOCIETY OF AMATEUR GEOLOGISTS.

We learn from a correspondent, that a Society bearing this title was started in London, in October last, under the presidency of Dr. Maybury, F.G.S., &c., and that it already numbers 35 members. The Society meets on the third Friday in each month at 31, King William Street, E.C., and will also arrange excursions during the summer months. The scope of the Society may be seen from the titles of the papers that have been read at the recent meetings, viz. :—

“Notes on Granite,” by Mr. H. Fleck.

“Notes on the Palæolithic Man in relation to the valley drift of North-west Middlesex,” by Mr. J. Allen Brown, F.R.G.S.

“Organic Acids,” by Professor G. S. Boulger, F.L.S., F.G.S., the Vice-President of the Society.

“Chemical Action as a Factor in Geology.” by the President.

At the last meeting held on the 15th May, Mr. G. F. Harris read a paper on “The Deposition of Sediment and the Formation of Shingle Beaches,” which was illustrated by diagrams.

An excursion is arranged to Loam Pit Hill, Lewisham, for the purpose of viewing the sections of the Lower London Tertiaries, &c.

We take the opportunity of commending this Society to the notice of young geologists, the Hon. Secretary, G. F. Harris, Esq., 68, Avondale Road, Peckham, S.E. will be happy to hear from any one desirous to join the Society, or to give every information.

OUR LONDON LETTER.

THE abrupt change in the weather which took place in the early part of this month has given a check to insect life, and consequently the hopes expressed in our last will hardly be borne out; still the month of May could hardly fail to give plenty of work to the entomologist, and a good deal of work has been done. The night feeding spring larvæ have proved fully as abundant as predicted in my last, *B. repandata* being fairly common again after a comparative scarcity of late years, and *T. fimbria* and *T. janthina* appear to have been taken in fair numbers. Of perfect insects, I hear of *L. lobulata*, *X. lithoriza*, *A. derivata*, *C. suffumata*, *A. pictaria*, &c., and among the diurnal species *S. alveolus*, *T. tages*, *E. mi*, and *E. glyphica* are all in about the usual numbers, whilst already London collectors are busy searching the *Genista anglica* for *P. cytisaria* and beating for the usual spring larvæ. A few hot days will bring out a host of species, and the approaching holidays should give Entomologists everywhere a golden harvest.

London, May 20th.

NOTES AND OBSERVATIONS.

ECHIU M PLANTAGINEUM IN NORTH WALES.—As I was looking through "Sowerby's English Botany" the other day, I was surprised to recognise a plant I found two years ago, from a sandy piece of waste ground at Beomouth, North Wales, namely the Purple Viper Bugloss (*Echium plantagineum*.) Sowerby gives Jersey as the only locality, as do other writers I have consulted. The "London Catalogue," too, gives the Channel Islands only. There was a moderate sized bush of it, but not knowing it I only took a small piece.—SIDNEY WEISS, Edgbaston, Birmingham.

THE "YOUNG NATURALIST" LIST OF BRITISH
LEPIDOPTERA.

By JOHN E. ROBSON.

A question having arisen as to this list being an infringement of a copyright claimed by Mr. T. P. Newman, its further publication is suspended, pending a settlement of the matter.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

JULY.

"Supremely fair the world does seem,
Now sunshine floods with golden light
Mountain and mead and moorland stream.
All nature smiles! gay butterflies
Their wings with gorgeous colours decked,
Some blue as azure southern skies,
Some with metallic silver flecked,
Flutter about the blossoms bright."

How enjoyable in July is a ramble through the leafy woods where the air is deliciously cool in the shade of the trees. As we walk along we see the Fritillary butterflies, with their silver spangled and argent-banded wings. Last month there were other kinds of these butterflies about than the species we see now, but they have lived out their short span of existence, and now *Aglaia*, *Selene*, and *Euphrosyne* have passed away, and *Paphia* and *Adippe* take their places. The former is known to entomologists, who delight in in English names for butterflies and moths, as the Silver-washed Fritillary. It is a larger insect than the *Adippe* or the High-brown Fritillary, and may be readily distinguished by the young naturalist by that circumstance alone. Moreover, it has silvery *streaks* or bands on the underside of the hind wings, while *Adippe* has the underside of these wings *spotted* with silver.

I am supposing that the wood into which I have been taking you in imagination is one of the ordinary character. Were it an oak wood we might expect to see the Purple Hair-streak butterflies (*Thecla quercus*) flying high up among the trees; and also, soaring in the air above their summits, that much coveted insect of which the poet Crabbe sings—

"Above the sovereign oak a sovereign skims
The *Purple Emperor*, strong in wing and limbs;"

and flying at a much lower altitude we should, in all probability, see the White Admiral butterfly (*Limenitis sibylla*), the white bands on the wings of

which give it a slight resemblance to *Apatura iris*, although it is a much smaller insect, and the wings are blackish brown instead of the beautiful purple tint of the Emperor butterfly. It made its appearance at the latter end of last month, and may be met with until nearly August.

Not only these but many other species are out now, or will appear within the next week or so; in fact this is the most favourable time of the year for observing or collecting butterflies. *Tithonus* is fluttering about the flowers growing on the hedge banks, and giving animation to the road sides; and every now and then as we walk along, we see *Janira* and *Hyperanthus* fly over from the meadow or corn-field on the other side of the hedge. *Egeria* is flying in woods and shady lanes; the Swallow-tailed is on the wing in the fens of Cambridgeshire; and a grand looking insect *Papilio Machaon* is when flying, as I can personally testify. May the day be far distant when it becomes numbered among the extinct British butterflies.

Arge galathea, or the Marbled White butterfly, appears about the middle of the month, and keeps out till about the third week in August. Of course, description of such a well-marked insect is superfluous. It is a local species, and seems to be commonest in the south, where it flies about the meadows. The Grayling (*Satyrus Semele*) and the northern Scotch Argus (*Erebia Medea* or *Blandina* of Doubleday and Stainton) come out about the same time, and nearer the end of the month the Painted Lady (*Pyrameis cardui*) and the Large Tortoise-shell or elm butterfly (*Vanessa polychloros*) appear; and besides these the second brood of the Heath fritillary (*Melitæa Athalia*) comes out this month.

Even these do not by any means exhaust the list of the butterflies of July. So numerous are they now that they make a most conspicuous feature in the entomology of the month. It must have been of this time of the year that Mrs. Barbauld wrote—

So the bright train their radiant wings unfold,
With silver fringed and freckled o'er with gold.
On the gay bosom of some fragrant flower
They, idly fluttering, live their little hour;
Their life all pleasure and their task all play;
All spring their age, and sunshine all their day.

The poetess, however, who has so pleasantly written about them, is not quite correct, I think, when she accuses them of "idly fluttering." Nothing is "idle" in the economy of nature; all have their uses. The Creator has made nothing in vain; every living thing has its appointed work to do. As for the butterflies (and it may be added the night-flying lepidoptera also), they perform an important part in the fertilisation of those flowers on whose "gay bosoms" they flutter.

The Purple Hair-streak butterfly has been already mentioned. Besides *Thecla quercus* two others of the genus make their appearance now, namely, the Dark Hair-streak (*Thecla pruni*) and the Black Hair-streak (*Thecla W-album*), and besides these some of "The beautiful blue butterflies" come out in July. These are the Mazarine blue (*Polyommatus acis*), the Large blue (*Polyommatus arion*) both alas! getting scarcer, and the Silver-studded Blue. At the end of the month these are joined by the Chalk-hill blue (*Polyommatus corydon*) and the second brood of the Common blue (*Polyommatus Icarus* or *Alexis*) which we see fluttering about until far into autumn. With the mention of these and the Small Skipper (*Pamphila linea*), which also comes out now and may be seen almost everywhere flying jerky manner so characteristic of the genus, I will leave the subject of the butterflies of this month.

I have spoken of the delights of a walk through the woods at midsummer. How pleasant too is a ramble by the side of a purling brook or deep-flowing river where the dragon flies are darting about in the sunshine—the brown *Æschnia cyanea* with the abdomen spotted with green and blue and two large yellowish-green spots on the thorax, the sides of which, moreover, are of the same greenish hue; the black *Æschnia juncea* or the red-brown *Æschnia grandis* and other species which I cannot now stay to mention. There are pretty sure to be some willow trees on the banks of the stream along which we are walking in imagination; suppose we search on their trunks for the larvæ of *Catocala nupta*. The best way to find them is to draw the fingers down the bark of the tree and feel for them. They may be readily felt with the tip of the fingers, whereas by trusting to the eyes alone it is very possible to overlook them, as their colour is so very inconspicuous. Ah! here we have one, the contrast between the feel of the hard rough bark and its soft body readily revealed its whereabouts, and we tenderly remove it from the crevice in which it was ensconced. Now we have it out we see it is greenish grey in colour, and there are slight rosy protuberances across the last seven segments, and it has also a double wavy line of a whitish colour on the back. It is a full grown specimen and will almost certainly pupate in a day or two; indeed it is useless looking for these larvæ later than the beginning of July. Were our ramble taken about three weeks later we might by good luck see the gray coloured moth to which it turns, at rest on a willow or a poplar tree. It is of course needless to tell my readers that the moth is only a grey one when its wings are closed as it sits in repose, and the beautiful crimson hind ones are hidden by the more sober-hued fore wings. This is the commonest of the Red Underwing moths, and any young naturalist may expect to meet with it in the southern counties.

Mention of *Catocala nupta* reminds me that it is time I said something about the night flying lepidoptera occurring in July. If we beat the oak trees about this time we shall possibly dislodge some little pale reddish moths which fall quietly into the net and lie as if dead. If we examine one of them we shall see that it has a zig-zag black line between the middle of the wing and the hind margin, while nearer to the hind margin itself is a row of black dots. By these characters we recognise it as *Calligenia miniata*. On the oak trees too we shall probably find the Black-arches moth (*Liparis monacha*.) The type form is, as every entomologist knows, white with black markings, but there is a variety (*Erimia*) entirely black.

The common Tiger moth (*Chelonia caxa*) comes out of the chrysalis at the latter end of the month, to the delight of young entomological beginners, and truly it is a magnificent looking insect, and if it were only as rare as it is common would be much prized by collectors. It varies a great deal as is well known. I have bred individuals, the larvæ of which fed on plants growing on wet heavy clay soil, which had the cream colour on the fore wings reduced to exceedingly thin lines, and the red of the hind wings intensified to a rich crimson with the bluish black spots large and confluent, while on the other hand I have bred specimens from larvæ feeding on plants growing on light dry sandy soil with but little brown on the forewings, and the red hind wings showing a distinct orange shade. I last year obtained a specimen from a chalky district with yellow hind wings. As is well known, very singular varieties have been bred by entomologists which I have not space to spare to particularise.

The Muslin moth (*Nudaria mundana*), the Footman moths (*Lithosia mesomella* *L. lurideola*, *L. complana*, *L. quadra* and *Eulepia cribrum*) the oak-eggar (*Bombyx quercus*). The Lackey moth (*B. neustria*), and the Drinker moth (*Odonestis potatoaria*) also come out in July, and besides these there are the orange, purple bordered, *Epione apiciaria*, the very pale whitish green *Metrocampe margaritata*, the second brood of the Common Early Thorn (*Selenia illunaria*), the White *Cleora lichenaria*, with wings dusted with greenish grey, and the Satin beauty (*Boarmia abietaria*), which should be looked out for in the neighbourhood of fir trees. The male is greyish black and glossy, with lines only on the fore wings; the female is paler than the male, and slightly clouded with pale orange. The moths may, by good fortune, be found sitting on the trunks of the trees. To these may be added the blackish dark annulet *Gnophos obscurata*, some specimens of which are very pale and others clay coloured. The former (*Var. Serotinaria Steph.*) occur in chalky districts, the latter (*Var. Dilucidaria Steph., Argillacearia Sldr.*) in places where the soil is argillaceous. The little dark grey *Psodos*

trepidaria occurs at Rannoch; and other Geometrina are the green *Pseudoterpna cytisaria*, the Large emerald (*Geometra papilionaria*), the bright pale green *Iodis vernaria*, which may be beaten out of Clematis, the Purple and Gold (*Hyria auroraria*), the little local *Acidalia rusticata*, the small Blood-vein (*A. imitaria*), the local *A. degenaria*, the beautiful Hook-tip (*Aventia flexula*), the V-moth (*Halia wavaria*), the common Magpie (*Abraxas grossulariata*), the local Yellow-ringed Carpet (*Larentia flavicinctata*), the Beech Green-carpet *Larentia olivaria*, the local grey *Emmelesia teniata*, the greyish brown silky *Thera coniferata*, the pale grey *Thera firmaria*, the very variable July High-flyer (*Ypsipetes elutata*), the whitish *Melanthia rubiginata* with dark central band interrupted beyond the middle, the Wood Carpet *Melanippe rivata*, and the uncommon *Scotosia rhamnata*, to be looked for among buckthorn, it is brown with blackish central band. Besides these there are *Scotosia rhamnata*, *Cidaria sagitta*, *C. immanata*, *C. prunata*, *C. populata*, *C. testata*, the pretty little yellow *C. fulvata*, common about rose bushes, the dull straw coloured *C. pyraliata*, which may be beaten everywhere out of white thorn hedges, *C. dotata*, *Pelurga comitata*, *Carsia imbutata*, and the whitish grey chalk carpet (*Eubolia bipunctaria*, the "central shade" of whose wings is double, and the "central band" edged with white.

I have only space for the bare mention of a few of the noctuina, but others will be found enumerated in the last volume of the Y.N., pp. 179-180. The only ones I have room here for are *Thyatira derasa*, *Bryophila perla*, *B. glandifera*, *Leucania lithargyria*, *L. pudorina*, *Hydreecia nictitans*, the grey-brown *Cerigo cytherea*, *Mamestra abjecta*, *M. furva* the pale brown *Apamea unanimitis*, the variable and common *A. oculatea*, *Agrotis corticea*, *Noctua C-nigrum*, *N. rhomboidea*, *N. brunnea*, *Cosmia trapezina*, *C. diffinis* and *C. affinis*.

Of the Deltoides we have in July the greyish brown *Hypena rostralis*, which is a quarter of an inch less in size than the common *H. proboscidalis*, and should be looked out for in hop gardens, the rare little *Schrankia turfosalis*, and the local *Herminia cribralis*. This last has whitish grey fore wings, and the lines represented by two rows of spots running transversely across the wing, and a small black spot in the centre.

Of the Pyralides flying now, I will just mention *Odontia dentalis*, which should be looked out for on the South Coast, where vipers' bugloss (*Echium vulgare*) grows plentifully, and the little rosy grey *Pyralis fimbrialis*, which having yellow fringes to its wings, is known as the Gold Fringe Moth, together with the uncommon *Diasemia literalis*, the rare gray *Botys terrealis* and *Pionea estivalis*. The latter moth is the same size as the Garden Pebble (*P. forficalis*), but has the lines represented by brownish dots only.

ON THE VARIATION OF SPECIES.

By C. W. DALE.

(Continued from page 127.)

Before proceeding further, I must correct a mistake in reference to *Satyrus janira*, "of which white and light-brown varieties occur in the north of England," should be south of England.

The richest and darkest specimens of *Satyrus janira* I know occur in the Isle of Harris. The Shetland Isles, the Outer Hebrides, and the Isle of Portland, furnish us with three splendid illustrations of local variation in *Hepialus humuli* var. *Hethlandica* of Staudinger, *Boarmia repandaria* var. *Sodorensum* of Weir, and *Eudorea mercuriella* var. *Portlandica* of Dale. This latter, which was for a considerable time, considered to be identical with the *E. phæoleuca* of Zeller, is subject to considerable variation, some specimens departing from the normal dark coloration of that species as found in other parts of England, to a pure white with a broad slaty grey band across the upper wings. Turning to the order Coleoptera, we find that *Nebria complanata*, Linn., assumes a more pallid hue in the neighbourhood of Bordeaux, than it does on the sandy coasts of Devonshire and Wales; and it is well known that examples of *Pelophila borealis*, Payh, from Killarney and Lough Neagh are permanently larger, and much more metallic, than those from the Orkneys. In Lundy Isle there is a *Psylloides luridipennis*, Kute, found in abundance on *A. brassica*, along the ascent from the eastern landing place, which varies "in every consecutive shade, between the limits of light yellow and dark metallic green, the former of which state (the normal one on that rock), might have been fairly set down as specifically distinct from the latter, did not observation on the spot decide the question for us without doubt."—See Wallaston on "Variation of Species, page 61.

The *Carabus exasperatus* of Curtis, which is found in Portland and other parts of Dorsetshire, is only a local variety of *Carabus violaceus* of Linnæus. *Anomala Frischii*, Fab., possesses a green variety *Julii*, which occurs at Lulworth. *Nebria brevicollis* has a broad thorax on the low ground at Amble-side, and a narrow one on high ground. In Portland also it has a narrow thorax. The *Leistus montanus*, Steph., again, is a mountain variety of *Leistus fulvibarbis*. Most species of Coleoptera are of a more pallid hue when occurring on the sandy shores of the sea, than they are when occurring inland.

Mr. Bates, in his interesting and valuable work, "The Naturalist on the River Amazon," tells us he has discovered intermediate forms to exist be-

tween the *Heliconia melpomene* of Linnæus, and the *H. thelixiope* of Hubner; and, consequently, that we have here in "the existence of a complete series of connecting links," an actual example in recent forms of transmutation of species. If a tendency to variation were a circumstance of very rare occurrence among the Lepidoptera, Mr. Bates' discovery would certainly be very valuable as well as interesting, but we have cases in our English Lepidoptera, in which the extreme varieties are quite as distinct as those mentioned by Mr. Bates. Take for instance *Cerostoma radiatella*, Don. In some examples the upper wings are entirely black, in others entirely white; and there is "a most interesting and complete series of connecting links between the two." In other instances the variation is quite as wonderful, as in the two allied species of *Cidaria russata* and *immanata*, and also in the Button Tortrix (*Peronea cristana*, W.V.), with its 35 named varieties, and its neighbour the Sham Button (*Peronea hastiana*) with 21. Among other orders I may mention the wonderfully variable Cuckoo Spit insect (*Ptyelus spumaria*, Linn.), of which it is difficult to get two alike; the Lady-bird (*Coccinella variabilis*, Linn.), the Humble Bee, belonging to the genus *Bombus*; the Grasshopper (*Gomphocelus biguttatus*, Charp), with its near neighbour of the genus *Rhammatocerus*; and the common Earwig (*Forficula auricularia*, Linn.), which varies considerably in the size and form of its forceps. Instances of variation in the shape of the wings may be seen in *Vanessa C-album* and the Notchwing Tortrix (*Teras caudana*, Fab.) In some specimens of the latter the notch is shallow, in others deep.

We cannot, of course, expect to find climatal varieties in the limited range of our British Isles, to the same extent as in the vast region of the Amazon; but still we have indications of such changes, as for instance in *Satyrus davus*, the depth of colour varying very considerably, according as the specimens come from the mountainous districts of the north of England, or the low marshy grounds near Manchester. *Melitæa artemis*, too, has its Irish and Scotch forms, in *Hibernica* of Birchall, and *Scotica* of Buchanan White. In the case of *Lycæna medon*, we find that in specimens from the south of England the spot on the upper wings is black, when it is the *Agestis* of Hubner; in Scotch specimens white, *Artaxerxes* of Fabricius; whilst in Durham intermediate forms are found, *Salmacis* of Stephens. *Arctia caya* and *Abraxas grossulariata* I consider to be the dog and the pigeon of English Entomologists, as by far the greater part of the wonderful varieties of those two species, emerge from the pupa state in the breeding cage.

Some years ago, a specimen of a moth was captured exceedingly dark in colour, which Mr. Curtis considered to be a variety of the Scarlet Tiger

(*Callimorpha dominula*), and my father of the Cream Spot Tiger (*Arctia villica*.) Luckily the specimen was a female, the eggs were collected and hatched, and the caterpillars reared, and the result was a brood of Cream Spot Tigers, with not a single variety among them. The offspring of a species that had reached the extreme limits of variation reverted at a bound to its original form. "And until this plan is followed in all doubtful cases, and until we find out that one so-called species, such as *Acronycta tridens*, or *Cidaria russata*, or *Peronea cristana*, produces specimens of another so-called or allied species such as *Acronycta psi*, or *Cidaria immanata*, or *Peronea hastiana*, or that the intermediate forms produce one or the other indifferently; we are not really in a position to say, in such cases, how much is due to common derivation, and how much, as in the case of *pseudo-morph crystals*, to the accidental circumstances of external resemblance." What we do know is—that heat and sunshine, cold and cloud, produce richness or dullness of colour; and that certain species vary, according to the geological formation of the soil, and the chemical properties of the food-plant.

Glanvilles Wootton, Sherburn, Dorset.

ARE BUTTERFLIES DISAPPEARING FROM THE BRITISH ISLES.

By C. W. DALE.

I certainly agree with Mr. Decie in attributing the main cause of all permanent disappearances to man; but will go further. Is not man filling the atmosphere of England with smoke? An eminent fern collector, Mr. George Wallaston, tells me that many ferns cannot live in certain parts of England. I have recently returned from Belgium, where Baron De. Selys Longchamps tells me that two species of butterflies, *Melitæa maturna* and *Vanessa levana*, have disappeared during his remembrance. Belgium possesses just one hundred butterflies, England sixty-four, Scotland thirty-six, and Ireland thirty-nine. I will now give a list of a few species which have disappeared from the County of Dorset:—*Papilio machaon* in 1816; *Aporia crataegi* in 1815; *Vanessa c-album* in 1816, to this species my father has added in his diary—"saw one in 1836"; *Lycæna acis* in 1839, this used to be even more common than *L. alexis*. Not only butterflies but also dragon-flies are becoming scarcer in the British Isles.

Glanvilles Wootton.

THE ASH.

Fraxinus Excelsior.

By J. P. SOUTTER, BISHOP AUCKLAND.

The oak, the ash, and the bonnie ivie tree,
O they flourish best at hame in the north countrie.

If the oak is the acknowledged king of the British forests, the ash is as unquestionably the queen of our native woods. If we miss the massive majesty of the "monarch oak," or the umbrageous stateliness of the mighty elm, we have in the ash an elegance of outline and graceful grandeur, which, with the airy lightness of its foliage combines to impart a feminine loveliness that makes every one assent to the regal title of Empress of the Grove. When in full leaf in summer there is no possibility of confounding the ash with any other of our indigenous forest trees. The large dark green pinnate leaves of four to six pairs of leaflets with a terminal odd one, like a rose leaf but larger, have nothing resembling them in our woods except the elder, or the mountain ash (*Pyrus acuparia*), a very different plant, but so named from this peculiarity in its foliage. But these are dwarf-branching bushes, of twenty to thirty feet, compared with the queenly stature of the ash, which attains a height of eighty to a hundred feet, with a circumference of twenty feet. Even in winter and spring when denuded of its leaves it can be readily recognised by the singular blackness of its buds, these are veritable little niggers, a feature which has been noticed by our poet laureate, who sings:—

"Black as the buds of ash in March"

Whilst another graphically describes—

"Its buds, on either side opposed
In couples, each to each enclosed,
In caskets black and hard as jet,
The ash tree's graceful branch beset,
Sweeps gracefully with easy sway."

The sooty buds, combined with the ashy hue, *i.e.*, a dull leaden grey colour, of its twigs and young branches, makes it easily distinguished in a forest even at a considerable distance. The bark of the first year's growth is remarkably smooth and even, but it soon loses this characteristic and becomes in the older branches and trunk of the tree seamed and furrowed with cracks and fissures. Aged trunks and stunted or decaying trees are frequently covered with gnarled excrescences like huge warts or wens, these are usually found finely marbled and mottled with veins when cut, and are therefore highly prized by cabinet makers and turners for fancy articles. So valuable is the wood of the ash for its toughness and elasticity that it has been called the

"farmer's friend," and before the iron and steel age had displaced the wood in the manufacture of agricultural implements this was truer than it even now appears. For resisting a sudden strain or bearing a heavy weight a beam of well-grown ash timber will not suffer by comparison with any other European timber, oak not excepted. Unlike most other trees, it is found the quicker it is grown the better timber it produces. Loving a rich loamy soil with plenty of moisture, it grows so rapidly that it is not unusual to find a shoot from six to nine feet of a single season. Those which spring from the earth, whether planted or self-sown, are known as "ground ash," and are noted for their pliability and toughness, being always in much request for tool handles, such as hammers, hoes, forks, walking sticks, alpen stocks, &c. Whilst the poles cut from "pollard ash," *i.e.* an old trunk cut down and the stool or bole allowed to produce a multitude of slender stemlets, forming a dense bushy crown, are not so dependable, but are useful for hurdles, stakes, crates, &c. The mature wood of the ash displays very large vessels in the concentric rings or annual layers of wood, by which it is easily known amongst other timber. In habit the ash exhibits a peculiar trait which adds much to its beauty in the landscape, and has long been noted by observers of nature. The branches primarily leave the trunk at an acute angle, but they soon bend outward with a graceful sweep, and then in old trees curve upwards at the extremities of the branches. A well known variety is the "weeping ash," whose pendulous branches make it a most ornamental object, and extremely suitable for arbours. The original plant the parent of all the trees known in cultivation was accidentally discovered in a forest in Cambridgeshire. It bears pistillate flowers only, and although it produces plenty of flowers and seeds, the trees grown from such seeds soon lose their tendency to bend, their distinctive character disappears and they resume their normal appearance. The peculiar drooping habit can only be perpetuated by cuttings or grafts from the original stock. The same peculiarity is manifested by the "weeping willow" which requires to be propagated in a similar manner. These plants are admirable illustrations of the property inherent in plants of transmitting any peculiar habit or character through an indefinite extent of time by sub-division of the individual, which cuttings really are, whilst manifesting a strong tendency to revert to the original type, or it may be to diverge into fresh vagaries of form, when reproduced in the ordinary way from seeds. The young twigs of ash instead of being round are much flattened and broadened out betwixt each pair of leaves, and the broader diameter cross above each node from which the leaves spring. A curious malformation also frequently occurs, known as fasciation, in which the branch is broadened out into a ribbon-like expansion, which often

curls like a shepherd's crook. Another peculiar monstrosity is sometimes seen in which the inflorescence grows thick and succulent, the flower does not expand but assumes a form exactly similar to a head of a cauliflower with the developement of which it completely corresponds.

The Ash belongs the natural order *Oleacea*, of which the olive tree (*Olea Europea*)—the emblem of peace and plenty—is the type, and gives its name to the order, its name being derived from the remarkably oily character of the fruit of this species, which furnishes the salad and olive oil of commerce. The close alliance of these trees is indicated by the fact that the olive may be grafted upon the ash, although as it requires a hotter summer it does not flourish in this country. Besides the ash, the only other indigenous representative of this order is the privet (*Ligustrum vulgare*), a small shrub with smooth pliable branches, opposite, entire leaves, small pure white flowers, followed by purplish black berries. Its most familiar use is the formation of hedges as leafy screens, for which it is eminently suitable, as it bears clipping and pruning well, and thrives even in the smoky atmosphere of towns. Its common name of "privet," "prim," or "prim-print," is said to be derived from the prim, precise habit induced by a free and frequent use of the shears.

Another equally familiar, if not better known, representative of this order is met with in every shrubbery and cottage garden, where its freedom of growth and fragrant flowers endears it to every one in the sweet spring-time. This is the lilac (*Syringa vulgaris*), of which Cowper sings:—

"The lilac various in array, now white,
Now sanguine, and her beauteous head now set
With purple spikes pyramidal, as if
Studious of ornament, yet unresolved
Which hue she most approved, she chose them all."

The poets have also lauded its perfume—

"The lilac has a load of balm
For every wind that stirs."

and another adds—

"How slowly through the lilac-scented air
Descends the tranquil moon."

A native of Persia it was introduced into this country in the time of Henry VIII., and is now one of our commonest ornamental shrubs, and the recent fashionable craze for early forced white lilac flowers is likely to make it a greater favourite than ever. Its stout panicle of flowers, technically called a *thyrs*e, is developed in exactly the same form as those of the ash. It has also the peculiarity of producing two terminal buds in autumn, so that in spring two equal branches are formed, and the bush assumes a forked habit. The common name of lilac describes the colour of the typical flower, a dull

violet tinged with white. In the language of flowers it is the symbol of "the first emotion of love."

The flowers of the ash are remarkably curious and worth close examination. They are simplicity itself, being utterly destitute of any floral covering, as there is not the faintest rudiment of a calyx or corolla present, hence they are called *achlamydeous*, meaning without a coat. They are also known as *polygamous*, because three different kinds of flowers occur, viz.: staminate, pistillate, and hermaphrodite. The blossoms appear in April and May, in dense clusters, on the wood of the former year's growth, the staminate being particularly conspicuous, as they form thick brown or dark purplish masses at the extremities of the branches. The flower-buds being produced in the axils of the leaves, they always appear in pairs on the opposite sides of the branch, whilst underneath them is seen the very evident scar where the leaf had been attached. Examining first a staminate cluster, when the bud scales are thrown off, the inflorescence is seen to be very much branched, each branch bearing six or more flowers, at the base of each branchlet is a small fringed scale, which sometimes assumes a leaf-like form, but more generally drops off when the flower expands. The flower itself is simply two stamens without the vestige of a style or ovary. The anthers are large, of a purplish brown or carmine hue, when mature they open by two longitudinal slits, and emit the dry powdery yellow pollen in great profusion, when this duty is discharged the whole inflorescence shrivels and drops off. In the hermaphrodite flowers, the only difference is that between each pair of stamens is a flattened ovary, surmounted by a rosy-tipped stigma. It is only comparatively rarely that these stigmas are fecundated and produce seed bearing fruit. In the pistillate flowers, the stamens are quite rudimentary, being functionally abortive, and never perfecting their pollen, but the pistils are all fertile, and when mature they form the familiar "ash keys," or winged fruits. To these, as a ready means of dispersion, is to be attributed the appearance of ash trees, so frequently seen on the tops of walls and inaccessible cliffs, to which they have been carried by the winds, for which their structure admirably adapts them. If one of these winged fruits be cut open a single large pendulous seed will be seen filling the cavity, suspended by a long slender hair-like stalk. These pendent clusters of fruit, which remain upon the trees well through the winter, were at one time pickled with salt and eaten as a salad or relish, before sugared preserves were so common. Like the olive tree, which only produces a full crop on alternate seasons, if an ash tree has been observed loaded with its winged fruits one season, the succeeding one it will be found almost or entirely sterile, as if it had exhausted itself with its previous efforts. Old writers on botany had noted that some ash trees were invariably

barren, but it was only comparatively recently that it was traced to its true cause, the polygamous and dioecious character of the flowers.

The Ash is a beautiful example of adaptation to environment. It is essentially a wind-fertilised plant, so the flowers are produced in advance of the leaves, and on the topmost boughs, the most exposed portions, the pollen is exceedingly abundant, remarkably dry and powdery, and chiefly borne on specialised trees, apart from the fertile flowers. The blossoms also are not encumbered with any showy corolla or sheltering calyx, which would only hinder the free transmission of the pollen. It may be a moot point whether this is a case of evolution or degeneration, whether these organs have never been developed as unnecessary, or become abortive and dispensed with as useless under altered conditions. But in a closely allied species, the flowering or manna ash (*Fraxinus ornus*), a native of the Mediterranean, and often met in shrubberies and ornamental plantations in this country, there is a well-defined calyx and a corolla of four narrow white petals, and the flowers do not appear till after the leaves are developed, showing it to be adapted for insect fertilisation. Any one who has an opportunity of comparing the two trees cannot fail to be struck with the strong similarity of structure and yet diversity of the two arrangements. The vernation, that is the manner in which the young leaves are packed up in the buds is very curious; it is an interesting experiment to a young botanist to dissect one just when it is opening out. When the outer black shaggy scales are thrown off the infant leaves are seen in pairs opposed to each other, their edges just touching, but not overlapping. The little leaflets each folded lengthways down the middle, ranged in two rows side by side, and so closely ranked that when once exposed the deftest packer could not restore them intact to the same compass.

The late leafing of the ash is a familiar fact, to again quote our Poet Laureate, whose accuracy in details of nature is proverbial, he says—

" Delaying as the tender ash delays

To clothe herself, when all the woods are green."

And it is very noticeable in all seasons, but particularly so in a late one like the present, when as all leafing is late it might be supposed the laggards would overtake the early ones, but this year at the last week of May the ash stood gaunt and verdureless, whilst all its compeers were struggling to array themselves in their vernal dress. Even the stately oak, with the dilatoriness of royalty, allowing all its subjects to bedeck themselves before it should don its regal garb, was at the same time striving to burst its swaddling bands, and its branches were adorned with the golden tinted foliage of its opening buds. The relative appearance of the leaves of the ash and oak has been woven into a weather adage in rural districts thus:—

" If the oak's before the ash
 Then you'll only get a splash ;
 If the ash precedes the oak,
 Then you may expect a soak."

Or, put more concisely "Oak, smoke ; ash, squash." But in other localities you may hear the rhyme :—

" If the oak is out before the ash,
 'Twill be a summer of wet and splash ;
 But if the ash is before the oak,
 'Twill be a summer of fire and smoke."

This reminds one of the proverb " When doctors disagree, disciples then are free." My own experience is that, irrespective of the present or prospective weather, the oak is almost invariably in advance of the ash. In Scotland, the ash is called the " Fool of the Forest," because it is the last to put on its leaves in spring and the first to shed them in autumn. And they do fall very early, the slightest touch of frost causing them to drop bodily without waiting to put on any of the gorgeous colours which embellish the foliage of most of our forest trees at that season. The leaves and young shoots are readily eaten by many animals, deer in particular are said to be passionately fond of them. But they are preyed on by comparatively few insects, so that its foliage does not suffer so much from their ravages as do several other trees, such as the oak, lime, willow, &c., yet it furnishes food for an obnoxious, yet sometimes useful, little beetle, the blister fly (*Cantharis vescitoria*), the cantharides of the chemist, and popularly known as a " fly blister." Fortunately, this little stranger is not plentiful enough in this country to be troublesome, our climate being too ungenial for it to thrive, but in France and Spain where it abounds, it becomes a pestilent nuisance, living or dead it is an unpleasant neighbour, for their dried bodies, when carried as dust by the wind, gives rise to intolerable irritation, and even serious inflammatory results. A decoction of the leaves and bark had at one time a repute as a febrifuge and tonic. The bark has also tanning properties, and the juice is highly inflammable, hence the old rhyme :—

" Burn ashwood green
 'Tis fire for a Queen ;
 Burn ashwood sear
 'Twill make a man swear."

The substance known and sold as *Manna*, is the sap of the manna ash already mentioned, it was at one time a fashionable remedy and in great request, but has now comparatively fallen into disuse. It is chiefly collected in Sicilly, and is obtained by piercing the tree, when the sap exudes and flows into receptacles in the same way as the juice of the sugar maple in America, or

else it is allowed to ooze out and spread down the stem, when it quickly dries and is removed in the form of flakes. The modern manna has, of course, no affinity with the manna of the Israelites in the Wilderness, but is a sweet substance, employed as a gentle laxative especially suitable for children. It derives its properties from a peculiar substance called mannite, which differs from other sugars in that it does not ferment with yeast and water as they freely do.

Without exception, there is none of our forest trees around which so many legends, superstitions, and folk-lore stories cluster as the ash. Our space will only admit of the merest outline of these numerous fables. It is the sacred tree of Scandinavian mythology, whose roots ran in three directions, one towards heaven, another towards the nether world, and the other towards the frost giants. Underneath its roots was a fountain of wonderful virtue, in which wisdom lay concealed. Odin gave one of his eyes to be permitted to drink of its water, and the draught made him the wisest of Gods ; and Odin formed the first man from a block of ashwood. In this connection it may be interesting to note that the ash is only once mentioned in the Scriptures, Isaiah xlv. 14, where, amongst the other elaborate preparations of the idol maker, it is said "He planteth an ash, the rain doth nourish it," &c. The Teutonic association of ideas with the ash as a suitable image-making tree seems to have influenced our old translators of the Bible, for in the revised version ash is relegated to the margin, whilst "fir-tree" is substituted in the text. The change is doubtless desirable, as the ash is not a native of Palestine, although the manna ash is planted there. According to the gipsies the cross was made of an ash tree. In ancient times, when war was the occupation of nations and the sword and spear their chief weapons, from the toughness of its wood the ash was an important tree, as of it the spear shafts were fashioned. The Anglo-Saxon name for the tree was *æsc*, and that term soon came to be applied to the weapon as well, so *æsc* meant a spear, and *æsc pleg* the game of spears—a battle. In process of time the name was transferred to the warrior himself, who was called an *æsc*, hence our surname Ashman would be synonymous with spearman. When the hardy Norsemen overran various tracts of Britain, they implanted many of their customs, and when they divided the land they marked it out with fences and hedges, of which the ash was a principal tree from its various uses and associations. It was made a statutory obligation in the tenure of many lands to keep up the number of ash trees by successive plantings. This accounts for the prevalence of ash trees about old homesteads and boundaries, of which sometimes these venerable trees are the sole landmarks, a relic of the time when the ancient marches were ridden in state :—

"That every man might keep his own possessions,
 Our fathers used, in reverent processions,
 With zealous prayers, and with praiseful cheere,
 To walk their parish limits once a year ;
 And well-known marks (which sacrilegious hands
 Now cut or breake) so bordered out their lands,
 That every one distinctly knew his owne,
 And brawles now rife were then unknowne."

Pelias the mighty spear of Achilles, which only the god-like hero could wield, was cut from an ash tree which grew on Mount Pelion. Of all the mythical virtues attributed to the ash none, perhaps, were more singularly curious than those which pertained to the "shrew ash." Our forefathers had a strange aversion to the harmless shrew. When any of their domestic animals were afflicted with cramps, pains, or stiffness of the limbs it was immediately supposed that the affected part had been run over by a shrew when the victim was asleep. A sovereign remedy for this affliction was for the sufferer to be well whipped with a switch of "shrew ash." To impart this prophylactic virtue, the following cruel and inhuman method was employed. A hole was bored in an ash tree, and a live shrew inserted in the cavity, when the aperture was plugged up and the poor prisoner would die a lingering and miserable death immured in its living cell. In mediæval times these "shrew ashes" were common, and our ancestors were never without a branch on their premises ready for emergencies. Doubtless a survival of this custom is seen in the fact that the herd boys in Scotland make their clubs of ash, as it is believed a blow from that wood will not harm the cattle under their care. Drovers prefer an ash rod from the same cause. In England the ash seems to occupy the position of the mountain ash in Scotland as an antidote to witchcraft, whilst love-born damsels use it in divination as to the progress of their love affairs. And to find an "even-ash," *i.e.* a leaf of equal pairs without the terminal leaflet, is considered a presage of good luck :—

"Find even-leafed ash and even-leafed clover,
 And you'll see your true love before the day's over."

This rhyme, with variations, is a very widely diffused piece of folk-lore. To the old herbalists the ash tree was an inexhaustible mine, besides the disease of the stone, it would cure the thrush, that affliction which it is said every one must endure, either when they come into the world or before they leave it ; it would charm warts and remove corns ; it was an effectual remedy for the bite of a viper. Indeed so strong was the antipathy of vipers to the ash, that if surrounded with a circle of ash leaves, they would sooner rush into a blazing fire than surmount them ! A curious custom is recorded from the Highlands of Scotland. When a child is born the attendant nurse puts a branch of ash in the fire, and collecting the juice which exudes from the un-

charred end, gives it to the infant as its first food ! Remembering the reputed qualities of the manna ash, perhaps this mouthful is not a whit more nauseous or deleterious than some of the abominable messes which are still administered by the lower classes in similar circumstances. A now happily obsolete ordeal was formerly inflicted upon young children who unfortunately suffered from rupture. The stem of a young ash tree was cleft, and the gaping rift kept open with wedges, the naked infant was then passed through the aperture by the father and received by the mother three times. The wedges were then removed, and the yawning chasm, of course, closed, and the trunk was bound up ; if the sides coalesced and the fissure healed up, as it was most likely to do, in like manner the child would be cured !

The ash is adopted as the badge of the Clan Menzies. In the language of flowers it is the emblem of "grandeur." Burns, in his song of similes in praise of the maid of Cessnoch Bank, says :—

" She's stately as yon youthful ash,
That grows the cowslip braes atween,
And shoots its head aboon each bush."

Or, as the improved version has it—

" And drinks the stream with vigour fresh,"

and happily expresses the characters of the ash. A good while ago a controversy was carried on in a scientific magazine about the literal accuracy of of the verse in "In Memoriam" :—

" Now fades the last long streak of snow,
Now burgeons every maze of quick,
About the flowering squares, and thick
By ashen roots the violets blow."

The question whether violets have any marked preference for the shelter of the roots of ash trees is not very easy to solve, they certainly have been found growing in such situations. But the general consensus of opinion seems to be that the roots of ash are deleterious to surrounding vegetation, although I think not so markedly so as some other trees, such as the beech.

Fraxinus is the old Latin name for the ash, Virgil says "*Fraxinus in sylvis pulcherima*," or as it has been translated, the Venus of the woods. The derivation of the name is obscure ; according to some it comes from the Greek "*phraxis*," a separation, as the wood is easily split ; others again from the Greek "*phrasso*" to hedge around ; and some would trace it to the Latin "*frango*," I break, this could not refer to the wood, whose toughness is proverbial, but might have an allusion to the disintegrating effect of its roots when growing on cliffs or old walls and ruins, a favourite habitat—and while it lends beauty and adornment to the crumbling pile, it aids in its decay.

Excelsior, higher, may refer either to its rapid growth, considerable height, or the great esteem in which it is held. The common name "ash," from the Anglo-Saxon *æsc*, a pike or spear, has already been explained. Another derivation is from the hue of the young twigs, a light grey, the colour of ashes. The Gaelic name is "*nuin*," "*fuinnseann*," which seem to have reference to enchantments in which it was used. And in connection with snakes and vipers, the Celtic "*asc*," a snake or adder, would be a probable derivation of the common name ash.

JOTTINGS FROM GLASGOW.

By JOHN MACKAY.

A few remarks on the entomological season in this district may interest your English readers, when compared with their own notes and observations.

Beginning from the end of last year, *C. brumata* appeared in its usual abundance along the hedgerows; and one specimen of *H. aurantiaria* was taken at Cadder Wilderness, about the end of December. This species occurs here every season, but never more than one or two specimens are seen, which however, serve to show that it has not wholly disappeared.

Towards the end of January *H. defoliaria* made its appearance on the tree trunks and palings, but was not common; while a month later, *P. pilosaria*, accompanied by *H. progemmaria*, was to be found at the Wilderness, the former sparingly, the latter less plentiful than I have seen it. *D. fagella*, as usual, was plentiful on the pines at the same locality, and continued abundant so late as the beginning of May. With March and its cold, sharp winds, came *L. multistrigaria*, an odd specimen being all that was seen at a time. It continued on the wing until the beginning of May.

None of my friends here nor myself tried the willow bloom this season. The weather at the time was very unfavourable, and none of us cared to risk a long walk with very little prospects of taking anything. A friend, however, at Paisley, writing me on the 25th April, informed me that in his district the bloom was fairly attractive, and on his first visit to the willows he had taken several specimens of *C. vetusta* and *exoleta*, *T. stabilis* and *instabilis*.

The month of May was very unproductive in insect life. The cold, wet weather which then prevailed prevented many species from making their appearance; but now that we are enjoying bright, warm days, insects are

beginning to show in fair numbers. From the middle to the end of May hardly an insect was to be seen. Two Saturdays in succession I visited one of our most productive localities, and I had only the satisfaction of seeing one male *F. atomaria*, a solitary garden butterfly, and a few *Gelechia ericetella* flitting abroad on the heather.

On the 6th June things began to look a little brighter. At Cadder Wilderness *G. alchimiella* could be taken pretty freely by beating the oak, and on the heather patches *G. ericetella* was very plentiful. A few *Nemophora Swammerdamiella* were also taken about the birches. The following Saturday produced a few more species. *E. indigata* made its appearance among the pines near the heather, along with *E. bimaculana* and other micros. *A. montanata* was represented by one specimen, while another of the same family, *M. sociata*, had begun to occupy its favourite position on the pine trees. Some old trees yielded a few of a rather good tinæ, *Anesychia funerella*; while on the way home an odd specimen of *S. hybridalis* was netted, the first of this insect I have ever known being taken in this neighbourhood.

On the 15th June, a few *E. alchemillata* were flying about the hedges at its usual locality, and a dark variety of *M. fluctuata*. The 17th added *Hepialus velleda* to the list, but it will not appear in any number for about a week or more yet. *Bouchardana* has also appeared near Paisley; and *D. sulphurella* in its usual numbers at Ronghill.

These are all the species which I have taken up to this date. The season is decidedly much behind in this district, the flourish having but lately appeared on the hawthorn; the hedges are now decked white with it. I am afraid we will be prevented from visiting some of our most productive localities this season. The woods being more strictly preserved than before, and the keepers ever on the alert for trespassers. It is difficult to get permission from some of the proprietors, and others will not on any account allow you into their woods. I have been stopped on two estates near here by the keepers, while on former seasons I had visited the localities almost daily without having once met them. As I had permission to both estates, of course, they had little to say. I was also met by a keeper in one of our best localities, and had to accompany him to the proprietor's house, where I was interviewed, and because of my respectability, was informed, as a great favour, that I would get off this time. This would have amused me had I not been caught picking the catkins off the willows (which contained larvæ of *Xanthia cerago* and *silago*), and the keeper knew enough of the law to know that this offence could have been magnified into wilful damage to property. It is amusing to relate that, after giving himself all this bother, an understanding was arrived at through the aid of a "tip." I am afraid this keeper will have

many visitors up to the proprietor's mansion before long, as any nice Saturday evening he may drop on at least half-a-dozen entomologists, busily engaged capturing insects on his domains. I had never before met a keeper in this wood, and I have visited it pretty regularly during the past few seasons.

I saw a pair of swallows for the first time this season on the 11th April, at Giffnock Quarries.

Kingston, Glasgow.

NOTES FROM A NATURALIST'S DIARY.

By W. H. WARNER.

PART I.

Looking over my diary the other day, which diary I may remark was commenced in April 1868, it occurred to me that a few random notes from its pages might possibly not be unacceptable to the younger readers of the *Young Naturalist*. As I am what may be called a general naturalist, these notes will be found to range over a very wide field, and though perhaps telling nothing new may possibly serve to awaken the interest of some young beginner. The notes are taken entirely at random, and when thought necessary are made plainer by additional remarks. With the permission of our esteemed editor these notes will be continued at intervals.

CHINESE CHARACTER MOTH (*C. spinula*).—Out May 27th. This pretty little moth is seen now commonly enough “at rest” on the fresh green hawthorn hedges, in its roof like position, and always when I see it thus reminds me of the droppings of a bird. This resemblance has no doubt saved it from the attacks of enemies many times, as the moth rests openly on the twig.

RINGED PLOVER (*C. hiaticula*).—A specimen of this pretty little sea-coast frequenter was brought to me to-day (May 5th, 1885), having been shot in a field not far from the river Thames in this neighbourhood. It is a common bird by the sea, but rare in these inland districts. Being one of a pair is it possible they intended to breed in this county? The bird is now in the hands of a taxidermist.

BUTTERCUP (*R. bulbosus*).—A specimen of this commonest of meadow-plants is now (May 11th, 1885) growing in our orchard, and bearing blossoms of a primrose or pale sulphur-coloured hue, instead of the usual rich, deep, glossy yellow.

HAWFINCH (*C. vulgaris*).—Our neighbour's cat brought in this evening (July 16th, 1876) a fine young specimen of this somewhat uncommon bird. It was fully feathered, but had not as yet assumed the black throat and lore of the adult. It had probably been bred somewhere in the neighbourhood. John's in his *British Birds* intimates that it breeds in the neighbouring county of Berks.

COMMON HUMBLE BEE (*B. terrestris*).—I once noticed a bee of this species on the ground unable to fly, and found that the cause was owing to its having a thick pellet of black coarse pollen attached to each hind leg, which weighed it down. On my removing one of these pellets the bee took flight.

CHIMNEY SWALLOW (*H. rustica*).—When going up the garden this afternoon (November 18th, 1877) between one and two o'clock, I saw to my surprise a single swallow shooting about rather low in the air over the adjoining farm-yard and outbuildings. Presently it came flying over my head several times, and I had then a good opportunity of seeing that my supposition was correct, and that it was indeed a swallow. I watched it for some time. It flew strong, so that an accident could not have been the cause of its remaining here so long. It was probably a late-hatched bird.

COMMON FOOTMAN MOTH (*L. complanula*).—Out (July 23rd.) When touched this moth tumbles and falls about as if it were dead, or as if it were merely an inanimate substance.

A STICKLEBACK'S NEST.—This evening (May 7th, 1882) when out for a ramble on the Newbridge road, I chanced to look over a bridge which spans a meadow. Under this bridge is generally some water, and standing on the bridge I could clearly discern the various small aquatic creatures disporting themselves. Several small fish were swimming about. One in particular, about two or three inches in length, seemed to keep in one spot, constantly darting and swimming round what appeared to be a heap of mud with a hole in the top. This proved to be its nest. The little fish would not leave it, but kept resting on the top time after time, and occasionally introducing itself into the orifice of the nest. Several small stones dropped by me plump into the water close to the nest, only startled the little fish for a second or two, as it returned directly to its post. It suddenly seized a piece of wood, somewhat similar to itself in size and shape, and swam off with it, probably thinking it to be a rival fish. The proprietor was a beautifully-coloured little fish. **NOTE**.—That sticklebacks build nests and guard them after is a fact well known to all naturalists.

SUNSETS.—Sunsets have been on such a gorgeous scale lately (Nov.-Dec., 1883,) as to have attracted general attention, and have not only roused the curiosity of the scientist, but have also caused the prophetic peepers into the future to make rather ridiculous exhibitions of themselves. The moon seen through these brilliant glows appears of a steely blue colour and sometimes of a decided green tinge.

BUTTERFLY.—It is said here (Oxon), that when a butterfly alights on a person it is a sign of good luck to the fortunate individual.

EYED HAWK MOTH (*S. ocellatus*):—Out (July 7th, 1884). Found a very fine specimen of this handsome moth "at rest" on the edge of a potato leaf, and in this position it so exactly resembled a dried and withered leaf that I was almost deceived, indeed I had to look at it very closely before I was thoroughly certain of its being a living creature. The hindwings being hid under the fore, the conspicuous eye-like spots were not visible. I never saw a much better example of "mimicry."

Standlake, Oxon.

To be continued.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting of this Society held May 21st was well attended, and there were a fair number of exhibits. The discussion for the evening was the life-history of *A. lathonia*, the subject being introduced by Mr. Harper, who exhibited a specimen captured at Darenth Wood in 1868. Some very interesting particulars regarding the species were given by those members who had been fortunate enough to meet with it, and a general opinion was expressed that it might at any time become more abundant after the manner of *C. edusa*.

The following meeting (May 28th) was devoted to *A. Euphrosyne*, of which species Mr. Pearson gave the life-history, and pointed out the difference between it and *A. selene*, further remarking that it appeared to be getting very scarce in most localities near London. Mr. Harper thought that the species was still fairly common, though owing to its habit of changing its head-quarters from year to year it sometimes apparently disappeared from the old localities. The general opinion of members, however, was that this and allied species were not nearly so abundant.

June 4th was the 27th Annual Meeting, and a large number of members were present. The Secretary presented his report of work done during the

previous six months, which showed that the Society had been fairly active in spite of drawbacks, in spite of bad weather, &c., and after the Hon. Treasurer had submitted his accounts the election of officers was proceeded with, the whole of the gentlemen acting previously being re-elected for another six months. A vote of thanks to them closed the proceedings.

On the 11th June, Mr. Hockett in the chair, Mr. Russell exhibited some very fine bred *B. repandata* and *N. brunnea*, the latter of which he presented to the Society's collection. Mr. E. Cooper shewed some *C. obliquaria*, from Wanstead; Mr. Pearson specimens of *C. reclusa*, *S. undulata*, and others from Epping Forest; while Mr. Lewcock brought up a fine boxful of Coleoptera, including *Mezium affine*, *Anthicus antherinus* and *Sitones regensteinsis*. The President announced to the meeting the news of the death of Mr. T. Cooks, the well-known naturalist, who was a member for many years, and a resolution expressing regret was passed and entered on the minutes, a copy being sent to Mr. Cooke's family.

At the next meeting, 18th June, Mr. Russell exhibited a series each of *N. triangulum* and *N. augur*, and Mr. Anderson brought up some *E. cerusella* from the marshes; but the chief centre of interest for the evening was Mr. Leacock's splendid lot of Coleoptera, including three specimens of *Asclera cærulea*, from Farnham, and fifteen *Donacia dentipes*, and five *Donacia menyanthidis* and others from Esher. Mr. Lewcock mentioned that he visited the above localities on June 13th in company with Mr. Cripps, and had a most productive day's work, taking between them about fifty species, including such insects as *Cleonus nebulosus*, *Hedera ochina*, *Anthocomus fasciatus*, several species of the genus *Bryaxis* and about 400 specimens of the genus *Donacia*, comprising chiefly *D. menyanthidis*, *D. dentipes*, and *D. thalassina*. It was remarkable that the members of the South London Entomological Society, who had a field-day at the same place, hardly obtained any of the species found by Messrs. Lewcock and Cripps.—ERNEST ANDERSON, Sec.

OUR LONDON LETTER.

It is with pleasure that I am able to report well of this district during the last month, though things are rather backward, most species appear well represented. In the early part of the month the larvæ of *S. rhamnata* were in fair numbers, both at Croydon and Epping, and the common species such as *C. temerata*, *A. candidata*, *N. pulveraria*, *H. abruptaria*, *V. maculata*, *M. montanata*, &c., were all noted. Later on the marshes produced the

usual *N. plecta*, *A. putris*, *C. unidentaria*, &c.; a fair number of *A. unanimis*, and countless thousands of *H. lupulinus* and *H. humuli*, some of the females of the former species being very large. From Croydon, *L. adonis*, *A. alsus*, and *L. agestis*, have been reported in fair numbers. I myself had a walk in that locality this morning, and found insect life very abundant. The *Silene inflata* being in full flower denoted that some of the *Dianthæcia* should be about, and a careful search resulted in the capture of thirty-five specimens of *D. conspersa*, *E. venosata* was also present, and in the hedges I observed *P. derasana*, *P. cynosbana*, *Geofrella* and *M. procellata*, whilst one patch of nettles was swarming with the full-fed larvæ of *B. verticalis*.

From Box Hill, too, we have good reports, *S. irrorella* being very common, together with *L. rubricollis* and others, so that the London lepidopterists have plenty of work just now.

London, 20th June.

NOTES AND OBSERVATIONS.

VARIETY OF *CÆNONYMPHA PAMPHILUS*.—I had the pleasure of taking a nice variety of this species the other day. The upper side is normal in colour, but the underside is of a rich mahogany brown. From its manner of flight, the dark underside was distinctly observable on the wing, or I would not have taken it, and after its capture I netted all I saw in a vain attempt to obtain another.—JOHN E. ROBSON, Hartlepool.

ABNORMAL SPECIMEN OF *RHAGIUM BIFASCIATUM*.—While mounting a few *Rhagium bifasciatum*, I found one that had eight legs, viz. three anterior legs on one side. Is this a common occurrence?—J. T. RODGERS, Oldham.

EXCHANGE.

DUPLICATES—*Alveolus*, *Tages*, *Lucina*, *Cardamines*, * *P. brassicæ*, * *Irrorella*, * *Dominula*, * *Plantaginis*, * *Prasinana*, * *Festiva*, * *Augur*, * *Triangulum*, * *Brunnea*, * *Nebulosa*, * *Typica*, * *Meticulosa*, * *Orbona*, * *Scolopacina*, * *Repandata*, * *Grossulariata*, * *Triliniaria*, *Ornata*, * *Sambucata*, *Vulgata*, *Multristrigaria*, *Aurantiaaria*, *Defoliaria*, *Clathrata*, *Russata*, *Candidata*, *Pratellus*, *Ulicetana*, *Fagella*, * *Pseudo-spretella*.

DESIDERATA—Numerous Macro and Micros, also Ova, Pupæ, or Larvæ of any but common species.—J. RUSSELL, 87, Huddleston Road, Tufnell Park Road, London, N.

* Are bred.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

AUGUST.

Fluttering in the August sun
Butterflies of every hue:
Purple, yellow, crimson, blue,
'Mongst the flowers all day they play,
Beautiful and bright as they.
When the sun his course has run,
And the twilight's gloom comes on,
Out from many a hiding place
Comes there forth a myriad race,
Winged moths unnumbered fly,
"Thorns" and "Mochas," "Gold-tails," *Chi*,
Silver-blotched *festuca*, *bella*,
Nanatella, *bifractella*,
"Grass-moths," "Heralds," Tortrices,
Mellonella (foe to bees),
Space will not permit to write
All that fly at dim twilight.

Butterflies are still a very conspicuous feature in the entomological world. The magnificent Swallow-tailed (*Papilio Machaon*) may still be seen in the fen districts, and the "Brimstone" (*Gonepteryx rhamni*), the Pale Clouded yellow (*Colias hyale*), the Red Admiral (*Pyrameis atalanta*), the Peacock (*Vanessa Io*), the Camberwell Beauty (*Vanessa antiopa*), the Brown Hair-streak (*Thecla betulae*), the Lulworth Skipper (*Pamphila actæon*), and the Silver-spotted Skipper (*Hesperia comma*). Regarding the second of these butterflies, it seems a thousand pities some better name cannot be agreed upon among entomologists than that by which it is generally known. The lemon-coloured *rhamni* is surely undeserving of so mal-odorous a name as the "Brimstone" butterfly.

Besides the above, the second brood of the Green-chequered White (*Pieris daphidice*), the Wood White (*Leucophasia sinapis*), the Wall (*Satyrus meg-*

cera), the Pearl-bordered and the Small Pearl-bordered Fritillaries (*Argynnis euphrosyne* and *selene*), the Green Hair-streak (*Thecla rubi*), the Azure-blue (*Polyommatus argiolus*), the Brown Argus (*P. medon*), the Grizzled Skipper (*Syrichtus malva*), and the Dingy Skipper (*Thanaos tages*) emerge this month. Imagos of the Speckled Wood (*Satyrus aegeria*), and the Gatekeeper or Large Heath butterflies (*S. tithonus*) also come out in August; and beside these the Grayling (*Satyrus semele*), the Meadow Brown (*S. janira*), the Purple Hair-streak (*Thecla quercus*), and the Small Copper (*Lycæna phlæas*), may be seen throughout this month. The last-named indeed keeps out until the middle of Autumn.

Even this does not exhaust the list of the August butterflies, for besides the above, the Painted Lady (*Pyrameis cardui*), the Large Tortoise-shell (*Vanessa polychloros*), the Comma (*Vanessa C.-album*), the Silver-washed Fritillary (*Argynnis paphia*), and the Chalk Hill Blue (*Polyommatus corydon*), which came out in July are visible all through this month, and then as we draw near to September, the Clouded Yellow and the Marbled White butterflies (*Colias edusa* and *Arge galathea*) begin to make their appearance.

The continental striped Hawk-moth (*Deilephila livornica*) is very rarely captured in England in August, and perhaps can hardly be considered a true British species. Entomologists, however, living on the South coast will do well to look out for a stray specimen. It may be distinguished from the Bed straw Hawk-moth (*D. galii*) by its whitish veins.

The rare Pigmy footman (*Lithosia pygmaeola*) occurs in August on the sea coast near Deal, and the Round Winged Muslin (*Nudaria senex*), the Brown, and Gold-tail moths (*Liparis chrysorrhoea* and *auriflua*) and the pale reddish brown, rather dingy, Grass eggjar (*Bombyx trifolii*) are other moths appearing now.

The second brood of the Purple Thorn (*Selenia illustraria*) comes out in August, and should be looked for in woods. Inasmuch as the moths which make their appearance now are smaller and paler than the earliest ones, Staudinger has distinguished them by the name *Aestiva*. Besides *illustraria* we may find *Ennomos erosaria* and *angularia* in woods in August, and at the end of the month *E. tiliaria*. This last named species and *erosaria* are about the same size, but the canary-shouldered Thorn is of a deep yellow colour with the fore wings dotted with fuscous, and two curved nearly parallel lines across them, while the "September Thorn" is ochreous coloured with the two lines approaching each other instead of being parallel as in *tiliaria*. *Angularia* is commoner than the other two, and we may sometimes meet with it in gardens where lilac grows. It is ochreous in colour, but rather reddish-looking. The first of the two transverse lines, or the one

nearest the base of the wing, is very decidedly angulated.

The Bordered Beauty moth (*Epione apiciaria*) may be met with in its localities until the latter end of the month, and the Tissue (*Scotosia dubitata*) and the rare ochreous coloured Gem moth (*Camptogramma fluviala*) are other August geometrina. Besides these the second broods of the False Mocha (*Ephyra porata*), the Maiden's blush (*E. punctaria*) and the other members of the genus *Ephyra*, as the clay triple-lines (*E. trilinearia*), the Mocha *E. omicronaria*, the Dingy Mocha (*E. orbicularia*), and the Birch Mocha (*E. pendularia*) also come out now. In order to distinguish these species it is advisable to notice whether an ocellus is present or not on each wing. If there be no ocellus and the wings are pale reddish grey, the probability is it is *punctaria*; if the ocellated spots are small and indistinct, and the ground colour of the wings reddish ochreous it is *trilinearia*; if the ocelli are distinctly visible in the centre of each wing it is one out of the four other species. Should there be a broad dark grey band between the central ocellus and the hind margin of each wing, and the ground colour of the wings be light straw colour, the species is pretty certain to be *omicronaria*, which I more minutely described at page 204 of the last volume of the *Young Naturalist*. If the specimen has no dark grey band then we must be guided by the colour in its identification, *Porata* is reddish grey, *pendularia* is whitish grey, and the rare *orbicularia* is grey dusted with reddish. (See *Young Naturalist*, vol. v. p. 204.)

The Noctuidæ appearing in August are the pale grey *Cymatophora diluta*, which we may take at sugar or find at rest on the trunks of oak trees, the dark grey or brown *Nonagria fulva*, which flies among the long grass in waste places before dusk, the brownish ochreous *N. geminipuncta*, whose habitat is the fens, the reddish looking *N. crassicornis*, and the pale-veined ochreous *N. typhae*, the pupæ of which may be obtained in the early part of the month by splitting open the stems of *Typha latifolia* in which it may be found enclosed in a slight cocoon. It is more likely to be found in such plants as present a withered appearance than in those which look healthy, and in those which possess the flower spike it is highly probable there is no chrysalis. The moth is a larger one than *geminipuncta*, some specimens measuring as much as two inches in expanse, while in the smaller species the moths on the average expand about an inch and a quarter. *Crassicornis*, which comes out in the latter part of the month is about the same size as *typhae*.

Other of the August Noctuidæ are the dark yellow *Gortyna flavago*, which may be taken at light; the pale rosy-brown *Hydroecia micacea*, the rare grey *Aporophylla australis*, the greyish ochreous *Luperina testacea*, the variable *Agrotis puta*, some specimens of which are greyish ochreous with blackish

brown blotches, and others with the fore-wings uniformly dark greyish brown; the grey brown, dark clouded *A. tritici*, with a black quadrate spot between the stigma, a whitish streak from the base near the costa, and three wedge-shaped black spots preceding the "subterminal line;" the dark olive-brown local *Tethea retusa*, distinguishable from the more generally distributed *T. subtusa* by the fact that the "inner line" and the "elbowed line" are almost parallel instead of converging at the inner margin; the pale orange or the ochreous yellow *Euperia fulvago*, the local reddish brown *Cosmia pyralina*, with grey hind wings; the whitish grey *Polia chi*, with a distinct mark like the Greek letter X on each forewing; the grey, yellowish-looking *P. flavocincta*, the very rare *nigrocincta* variety of *P. xanthomista*, which at this time of the year occurs, chiefly at the Isle of Man; the greenish grey *obscura* variety of *Epunda lichenea*; the rare brownish ochreous *Heliothis armigera*, the hind wings of which have a narrow greyish central lunule, which is also the case with *H. peltigera*, but this latter has a black dot at the anal angle, which is absent in *armigera* it also flies much earlier in the summer, and there is no probability of meeting with it now; the golden brown, silver-blotched, *Plusia festuæ*, fond of reed beds and their neighbourhood; the reddish-grey and orange Herald Moth (*Gonoptera libatrix*), and the rare narrow-winged dark grey *Stilbia anomala*. To these may be added *Noctua bella*, *N. Xanthographa* and the heath frequenting *N. neglecta*.

To turn now to the Deltoides and Pyralides, the second brood of *Herminia derivalis* appears in August, as does also the little ochreous brown *Stenia punctalis*. It has oblong, rather lanceolate fore-wings, white reniform stigma, and short hind wings. In size it expands ten lines. The legs are so very long that it is known as the Long-legged Pearl. *Paraponyx stratiotalis* may also still be taken this month by the side of streams and ponds where water aloe (*Stratiotes*), and water star-wort (*Callitriche*) grow, and at the beginning of the month the little *Acentropus niveus*, the larva of which is truly aquatic, and feeds on *potamogeton*, breathing by branchiæ. The moth has narrow whitish-ochreous, semi-transparent, fore-wings, with the veins distinctly darker, and white hind ones. Besides these, *Ebulea sambucalis*, *Pionea stramentalis*, *Spilodes sticticalis*, *S. cinctalis*, *Scopulea lutealis*, *Scoparia cembralis*, *S. truncicolalis*, *S. crategallalis* and *S. phæoleucalis* are still out, and the little *Scopula ferrugalis* and *Scoparia lineolalis* also fly in August. The former is ochreous in colour, with distinct stigmata and lines, and expands nine or ten lines, *lineolalis* has narrow fore-wings, with the dark grey first line very obliquely placed.

Crambus inquinatellus is one of the "Grass Moths" flying in August. It is brownish ochreous in colour, with two transverse brown lines, which are

not very distinct, and not sharply angulated as in *Crambus geniculellus*. It is smaller than the common *Crambus tristellus*, and has no brown angulated line on the hind margin as that moth has. Many of the veins are whitish ochreous, and the fringes of the wings are destitute of the glossy appearance those of *geniculellus* present.

Among the Tortrices which the lepidopterist may meet with this month are *Phlæodes immundana*, *Bactra lanceolana* (common among rushes), the common little *Anchylopera laudana* and the variable *Dictyopteryx contaminana*, so common about hawthorn up to the end of October. I have not space for any others.

The yellow-grey larvæ of *Acronycta megacephala* may be found this month on poplar trees, and the slightly hairy, green caterpillars of *A. ligustri* on ash and privet, as also may the brownish-black, blue-spotted larva of *A. salicis*, on willow. Other August caterpillars are the brown *Axylia putris*, with yellow dorsal line, feeding on low plants; the green, white-lined *Trachea pini-perda* on fir trees; the grey *Dianthecia carpophaga*, the yellow *D. cucubal*; (both of which feed on the seeds of *Silene inflata*); the green *Heliothis umbra (marginata)*, with yellow spiracular line, and the green *H. peltigera*, with white spiracular line, both of which should be looked for on rest-harrow.

Besides these, may be found the green larva of *Venilia maculata*, with white spiracular line, feeding on nettle; the brown caterpillars of *Biston hirtaria*, on elm; and the brown, marbled with white, *Amphydasis prodromaria*, on oak, birch, and other trees, it has six little reddish protuberances, two on the eighth segment, two more on the ninth and two others on the twelfth. Other looper caterpillars to be found now are the variable (brown, green, or grey) *A. betularia*, on birch, having a bifid head and four whitish protuberances (two on the ninth segment and two more on the twelfth); the reddish and black *Tephrosia crepuscularia* on willow, elm, poplar, and other trees; the lilac-coloured *Asthena sylvata*, on alder; the elongate green *Melanthia albicillata*, with seven triangular red spots on the back and white spiracular line, feeding on bramble and in gardens on raspberry; and the brown *Melanippe hastata*, living in rolled up birch leaves, and recognisable by the row of yellow spots along each side in a line with the spiracles.

Cambridge.

THE COMMON TOAD.

(*Bufo vulgaris*.)

By W. H. WARNER.

The favourite haunts of the poor abused toad are damp, moist, ditches, gardens, and orchards, and here, notwithstanding the poisonous reputation

it bears, it leads a quiet inoffensive and useful life. Though common and generally distributed, comparatively few toads are to be seen during a country walk: this arises from the retiring and nocturnal habits of the reptile. Gardens seem to be a particularly favoured haunt of the toad, and for cellars also it has a great liking. I have seen toads in cellars in the suburbs of London, and still more commonly in the country, and have often wondered how they contrived to pick up a living in such places.

Cellars, however, are a favourite resort for many animals. In the cellar of a house in Berkshire, which cellar is many feet below the surface of the ground, lived and flourished, at different times, to my knowledge, quite a small menagerie, consisting of the following members of the British fauna—a toad with a most decided tendency to *embonpoint*, two ditto not quite so lusty, two or three frogs with a greater tendency the other way, several warty newts large and small, a long-eared bat (*Plecotus auritus*) hung up by its hind-claws to a beam, several garden snails (*Helix aspersa*) clustered near the window, many yellow, spotted, brown, and green slugs dragging their slimy lengths on the walls, a gorgeous peacock butterfly (*Vanessa io*) perched on the window frame, several devil's coach-horses (*Ocypus olens*), and ground beetles (*Carabi*), as well as clouds of gnats and flies, and hundreds of spiders. I have found many a worse place in which to study Nature than that old cellar in Berkshire.

The toad occurs commonly in all parts of the United Kingdom, with the exception of Ireland, where we have no record of its ever having occurred in a truly wild state. Both the frog and the toad are often of very local habits. A writer in Science Gossip, speaking of a place near Stroud in Gloucestershire says:—"Toadsmoor Valley gets its name from the number of frogs and toads that swarm there. On a warm, damp night it is hardly possible to avoid treading on them. It is easy to see how a story of a toad in a rock might occur here, as they retire to all sorts of crevices in the oolite, which is very damp, and would very likely turn up in quarrying. At the end of June when I first went there, all the young frogs, which were blackish, and about three-quarters of an inch long, were leaving the pond at the bottom of the valley, and beginning the ascent of the hills. There were swarms of them, and they went steadily hopping over the path and up into the woods. They continued doing this all the month. One lot I noticed in the afternoon were going up over the path for a long time, and when I looked at them again they had all as if by one consent turned, and were progressing along at right angles to their former course, for what reason I was not able to find out. The owner of the furthest up mill in the valley tells me that his mill-pond used to be filled up with spawn, but since some change in the chemicals

used in work, there had been less than there used to be. I am told that both the ringed snake and the adder were rather plentiful. I only saw one of the former snakes."

About the end of February or the beginning of March the toad appears, and may then be seen in many a wayside ditch and quarry-pool, sitting with his ugly phiz poked above the surface, and staring most earnestly at nothing in particular. Occasionally he will give vent to his feelings by a hoarse gurgle, and if alarmed ducks below the water, and swimming with almost the agility of the frog soon disappears. Later on, that is about the middle or end of March, though the time varies considerably, the toad deposits its spawn, and those which have hybernated in various places on land are often compelled to travel miles before they find a ditch or pool suitable for the purpose. Now the country rambler may hear the song of the toad. This, of course, is not very musical, consisting of a succession of short gruff notes, repeated very quickly. When the breeding season is at it height, a reptile-haunted pool presents a scene of great activity, particularly as evening comes on. First one ugly head is poked above the surface of the water, then another, then a frog will croak to a neighbour in the water, and a toad gurgle to an acquaintance close by, varied sometimes by a regular chorus of croaks, especially when rain is at hand.

At this time (March), we see the toad in couples in the water, often entangled in strings of ova. It is now easy to distinguish the sexes: the male is dark in colour, comparatively well shaped and small, while the female is fearfully bloated and heavy. The spawn of the toad is very beautiful, consisting of double bands or chains of clear, jelly-like gluten, several feet in length. In these chains, at unequal distances, the jet-black, bead-like eggs or ova of the reptile are placed. These strings of spawn are wound round any roots, plants, or stones, which happen to be at the bottom or sides of the pools. In about three weeks time the eggs hatch, and the little tadpoles are released. In appearance and habits they much resemble those of the frog, but are smaller and darker, their transformations, however, are very similar. I once found a few toad-tadpoles in a sheltered quarry-pool, so late as Nov. 8th. These tadpoles were provided with legs.

In June the little toads assume their perfect form, and issue in multitudes from the ditches and pools. The following note from my diary for 1875 will prove this. "June 17th.—Close to the edge of the biggest pool was a half-circle of little black creatures, a moving wriggling mass of the tadpoles of *Bufo vulgaris*, in all their stages of growth. There were true tadpoles of all sizes, some others with hind legs, some with fore and hind, and small toads some with tails and some without. Such a sight I never saw before. To

speaking within due bounds, I should think there were thousands of these little creatures all of a mass. Then on the sand by the side of the pool and among the grass close by were piled and clustered hundreds, indeed, I may say thousands of tiny toads all belonging to the same species. Some of these little toads thus on land had not yet dropped their tails." The young toads continue to issue from the water through July and August, and may often be found crouching under stones, several of them together. A great many of these little toads perish before they attain a respectable size. In our September rambles we frequently meet with a compact, bright-eyed little toad, of a brightish brown, with a dull red spot just behind the head, and bluish-grey below, making it way among the grass by the side of the road. This solitary little toad is one of the many which migrated from the ditch in June.

There is one peculiarity in the habit of the toad, which I cannot explain; this is its habit of carrying the younger members of the same family on its back. I have only seen one or two instances, and that when a boy. In the dampest part of our old fashioned garden—ah! how many sly nooks and corners there were for birds and reptiles in that old garden—lived a sedate old toad presumably one of the gentle sex. On one occasion I found her marching along with two or three good-sized young ones on her back, and I will remember how hard I tried, boy-like, to poke them off by means of a stick, but found myself quite unable to do so from their clinging so tightly to her.

Soon after the toad has deposited its spawn in spring, it comes to land, and is commonly seen in gardens till the approach of winter. During the day it crouches in holes of walls or under stones, and occasionally buries itself in the soft mould of a flower bed. When the shades of evening appear the poor toad comes forth in search of food. After a sudden shower in summer the toad is at the height of his enjoyment. He then issues forth, even in the day-time, and with ungainly hops and crawls prepares to banquet on the feast before it, for at these times the lawns and flower-beds teem with slugs, worms, beetles and grubs. The toad is one of the gardener's best allies if he did but know it, and as a collector of Coleoptera it has but few equals. A gentleman who collected these insects was in the habit of enriching his cabinet by killing other collectors, to wit the toad, and robbing them of their spoils. By this cruel means he secured many a rare nocturnal insect. The tongue of the toad is very long, the tip pointing down the throat, the root or base being situated at the entrance of the mouth. When toady sees an insect which he fancies, his hind-toes begin twitching in the greatest excitement, and with nearly the rapidity of a flash of lightning, flings out his tongue, secures the insect on the tip and swallows it almost as quickly. If,

however, the prey be a worm, the toad seizes it with widely-opened jaws, and not with the tongue. It will not touch dead insects. The principal food of the toad seems to be beetles, but it is likewise fond of other insects. Beekeepers tell us that the gatherers of honey are often devoured by the toad.

The toad frequently changes its skin, previous to which it refuses food, but makes up for it after the change. A clergyman in a letter to me on the habits of reptiles thus speaks of the toad changing its skin.—“A few days ago I was fortunate enough to see the operation of a toad casting, or rather changing its skin, and then swallowing it. I did not witness the first part of the operation, but my little son did, and he called me to see it. I plainly saw the skin of both the fore-legs drawn off like a stocking, and swallowed. The outer skin was perfectly dry, but the new skin was quite shining with moisture. The animal was so intent upon its occupation that it seemed to take no notice of the three faces that were peering down not twelve inches from it. The toad sucked, or rather snapped in its skin as it would a worm, but there was no sign of mastication.”

Popular tradition attributes most venomous powers to this poor inoffensive creature. In Berks, Oxon and other counties we are gravely assured, not only by the ignorant rustic, but also by more educated people, that it is full of fire and poison, that it spits fire, and that its venomous exhalations infects the whole neighbourhood, even to the leaves of the tree under which it burrows. It is hardly worth our while to refute these absurd statements.

That the toad secretes a very poisonous humour, however, is a well-known fact. See how quickly a dog will drop a toad after seizing it, and how its mouth will froth. This poison is secreted in the warts or tubercles, with which the skin of the toad is covered, and is a thick, fetid, yellowish-white acid liquor.. If received into the blood through a cut or sore, this liquid will, it is said, cause faintings, vomitings, and even death, but whether it is quite so virulent as this, is, I believe, open to doubt.

Again, the toad is looked upon with considerable faith in some rural districts as a healer of certain diseases. I copy the following from the leading journal.—“It is not long since that a “cunning man” used to hold an annual *levée* in the neighbourhood of Stabbridge, when he sold out to crowds that thronged round him the legs torn from the bodies of living toads, and placed in a bag, which was wound round the neck of the patient, and counted a sovereign remedy for scrofula, and the “overlooked” —. It was called “Toad Fair.” An infallible gipsy method of injuring an enemy is to procure a toad, stick it all over with pins, and then with sundry incantations and ceremonies bury it in the earth. I was once gravely assured by a country.

man that the only reliable means of getting a horse through a fire, was to boil a toad to a jelly, take out a certain bone, grind the latter to a powder, and mix it up with some stuff from a chemist. The particular bone to be used, name of the chemical "stuff" and method of using this wonderful preparation, did not appear in my friend's rather vague directions.

Probably but few creatures have so many enemies as the toad. Where we find one person tolerate the poor reptile, we find five hundred raising their hands against it. And why is this? The only answer we can give is simply—because the toad is very ugly. So he is, but he has his good qualities too, and in cases where intelligent observation has taken the place of ignorant prejudice, has been found to be the possessor of a species of intelligence, hardly to be expected from a creature of such a dull, lethargic disposition. Many authentic anecdotes could, however, be brought forward in proof of this.

On one occasion, I saw the toad so late as the third week in November, but as a rule it retires to hybernate at the end of October. Its winter retreat is usually a hole at the roots of a tree or shrub, and here, torpid and alone, it passes its time till the sun of March warms it to life again. I once saw a spaniel dog in October, burrowing away with great desperation in an ivy-covered bank, and after working away for a short time it unearthed a largish toad, which was buried at the root of a stump. Sometimes the toad will choose as its hybernating place a hollow tree, or heap of stones, and it has been known to climb up the face of a sand pit cutting, find a soft place, scratch away the sand, and burrow a foot and a half into it. When spring came the following year, these toads travelled two miles to find water in which to place their spawn.

The length of the common toad when full grown, is about three inches and a half. Its skin is covered with warts and pimples. The usual colour is dark brown above, and whitish on the belly. The hue of the upper parts, however, seem to depend a great deal upon the locality; thus we may expect to find very dark-coloured toads in the garden earth, ruddy coloured ones in gravel, and so on. I have met with very many varieties, browns of all shades, one almost black, another nearly yellow, some of a decidedly greenish cast, and others quite as decided a red. The absence of the sulphur-coloured line down the back, as seen in the Natterjack is a sufficient distinction between the two British toads.

Standlake, Witney, Oxon.

[Toads have often been observed to frequent sugared trees. This year I have noticed one regularly at a tuft of Bladder Campion (*Silene inflata*), taking the insects that came to the flowers.—J.E.R.]

ARE BUTTERFLIES DISAPPEARING FROM THE BRITISH ISLES?

By JOHN E. ROBSON.

FURTHER communications on this subject have come to hand, but as they contain little or nothing that has not been said by others it seems needless to allow the discussion to drag on till it becomes wearisome, and I therefore give my promised summing up.

All correspondents have agreed with the general conclusion at which I had arrived, though they differ more or less with the details. It scarcely seems to matter whether the details of my paper are right or wrong, while the conclusion is not denied. Whether *Polyommatus hippothoe* disappeared in consequence of greedy collectors exterminating it, of the fens it inhabited being drained and the food of the larvæ destroyed, or of the larvæ themselves being drowned by a flood, is a matter of very little consequence so long as we cannot dispute the lamentable fact that it has disappeared for ever. Those who argue without practical result might show that man was responsible in either of the above cases. But such an argument would not advance our knowledge, and if we agreed that man had done it, the question of means would still arise, and the actual cause would merit separate mention. Suppose three different species had been lost, each by one of the above causes, it it would be entirely misleading to say they had all been exterminated by the action of man. But I would call Mr. Decie's attention to the title of my paper in the March number (p. 59). I did not seek to enquire into the cause of the disappearance of our butterflies, but whether any general diminution of their numbers was really going on. In going through the different species I named, I merely referred to the facts of their disappearance from various places, and scarcely ever to a cause for such disappearance. Certainly, I did, in the last paragraph, mention "*the cause generally assigned*," but only because the table given in the previous paragraph seemed to support this generally assigned cause, and the whole subject was dismissed in a few lines. Mr. Decie and Mr. Dale seem to think that I am wrong in accepting this conclusion, and hold that human agencies have had much more to do with what we all so much regret. Mr. Decie goes much into detail, and I cannot but notice that while he is arguing that "the main cause of all permanent disappearance of our butterflies is not the weather but man," he attributes far more importance to the influence of the weather than he seems to be aware of. Thus, in speaking of *M. artemis* he tells us that in his part "of

the country bad seasons have been positively beneficial to it." He proves this by showing that bad seasons have impoverished the farmers, who for want of stock have neglected their pastures, and that the Devil's-bit Scabious has consequently become much more plentiful, and *artemis* larvæ have found abundant food. He tells us how its range had become extended, and that the larvæ last year were numerous in fields where they had not been seen before. Then he goes on, "*unfortunately it was very cold* about the time the imagines should have emerged, and their number was by no means proportionate with the number of larvæ seen. There were, however, I hope, enough to ensure a good show this year *if the weather be propitious.*"

But cold weather at the time the imagines should appear is not the only thing that insects suffer from. Open winters and mild weather in February and March tempt hibernating larvæ from their winter retreat, and after they have begun to feed again they seem much less able to resist cold than they were before. Take the present year as an illustration. On the 1st of January I saw mushrooms gathered in the open fields in this immediate neighbourhood. On the 16th of May the same fields were covered with snow. Could anything illustrate more forcibly the character of our seasons, and if I am told that this was exceptional, I would reply that such a season may destroy to an extent that many more favourable years will not restore. Hibernating larvæ appear to bear considerable cold with impunity. I have dug up larvæ that were frozen stiff, and that could be snapped like a twig. I have thawed such larvæ with the warmth of my hand, allowed them to crawl off on to the snow, to be frozen stiff again in a few minutes, and this I have repeated more than once with the same larva. But larvæ subjected to extreme cold after commencing to feed up have never recovered in any experiment I have tried, though certainly some must do so.

Again, sometimes we have a cold summer, with rarely a glimpse of sun, and frequent chilly rains. In such a season butterflies are seldom seen on the wing, and their chances of pairing and depositing their eggs are few. Crepuscular and nocturnal species may be equally adversely affected by a mild winter and cold spring, but a damp summer does not prevent them appearing on the wing and performing those acts necessary to perpetuate their race. Diurnal species become torpid on a dull day, and a continuance of dull days is fatal to them. There is in the insect world a wonderful amount of recuperative power, and a few favourable seasons coming together, might restore a species to its normal abundance. But we do not get several fine seasons in succession, or very rarely, and that is why our species do not recover their position, while our insular position prevents all those capable of but short flights from reappearing when once lost.

I am free to admit that the seasonal influences do not seem to me sufficient to account for all the phenomena. How, for instance, does the mild winter and cold spring affect adversely those *Pieridæ* that pass the winter as pupæ, of which several are in the list to follow?

Mr. Decie objects, however, not only to the assigned cause for the disappearance of our butterflies, but also to the assumption "that the time is not very far distant when a large proportion will have ceased to exist as natives." Yet he only appears able to put off the evil day, and to persuade himself that "though there is certainly a process of extinction going on,—yet the time is exceedingly far distant," &c. The more "exceedingly far distant" the better, say I, and I had no idea of limiting the period so narrowly as Mr. Decie appears to have understood me. A thousand years is but a swing of the pendulum in the great timepiece of nature.

I will now run over the various species already named in my paper, or by others, and see what has been advanced that can lead us to satisfactory conclusions. Mr. Decie must forgive me if I am brief, but the paper must not be inordinately long.

1. *PAPILIO MACHAON*.—Is admittedly restricted to a very narrow area now. It bred at Beverly in Yorkshire, in 1803 (see Porritt's "Yorkshire Lepidoptera," page 7.) It disappeared from Dorset in 1816. It was once a common garden insect in the suburbs of London, and is yet to be found in lanes and gardens over the greater part of the Continent. It passes the winter as a pupa. Why it is becoming so restricted does not appear to be satisfactorily determined.

2. *LEUCOPHASIA SINAPIS*.—Not named by me, but Mr. Clifford calls attention to it as a species now scarcer than formerly, which he attributes to the ungenial springs killing the female ere oviposition.

3. *PIERIS CRATÆGI*.—Mr. Dale tells that it disappeared from Dorset in 1815. Hybernates as a small larva. It has long been known to have become much scarcer than formerly.

4. *PIERIS DAPLIDICÆ*.—Mr. Jobson (p. 96) has taken this on three separate occasions between Cambridge and Newmarket, and is confident it breeds there, in the proper sense of the term, one of the specimens being hardly dry when found. If it bred there it could be taken regularly, not three times only in the course of an Entomologist's career. There is no doubt it was once of regular occurrence, but it is rarely taken now, except at that part of the coast nearest France. Like *Machaon* it passes the winter as a pupa, and I know no reason why it should not be as abundant as the three Common Whites.

5. *COLIAS EDUSA*.—Nothing more to add. The immigration theory appears to be gaining ground.

6. *COLIAS HYALE*.—The same remark may be made here.

Mr. Decie is unable to understand how the fact that these two species only retain their place by immigration helps my case, and asks for proof that they ever were true natives. This, of course, I cannot supply, and they have both been very erratic in their appearance for many years. Let Mr. Decie, however, explain why *Colias edusa* suddenly becomes abundant all over the island, then gradually disappears, which occurs every few years, and if he can put forward a better theory I will be glad to adopt it. If the spring immigrants produce the native born summer brood, why is the latter only able to carry on its race to so limited an extent that a year or less sees the end of it.

7. *ARGYNNIS PAPHIA*.—Mr. Clifford says it is much rarer in all parts of England than formerly. I never saw it in this district, though it is on the old lists for the county.

8. *ARGYNNIS AGLAIA*.—Mr. Clifford seems to confirm my statement and to imply that though formerly taken near Gravesend, it had already disappeared when he commenced to collect 30 years ago.

9. *ARGYNNIS ADIPPE*.—Coupled with *Aglaiia* in Mr. Clifford's remarks.

10. *ARGYNNIS LATHONIA*.—Nothing has been advanced to controvert my brief remark, but Mr. Clifford mentions the capture of twelve specimens one season in a wood near Shoreham, as affording evidence that it may occasionally breed here. Why it does not often do so is what needs explanation.

11. *VANESSA POLYCHLOROS*.—Mr. Clifford names this species as being "certainly less frequent than it was 20 or 30 years ago."

12. *VANESSA IO*.—Mr. Clifford adds to my north country observation that he has not seen it for many years in North Kent, where it was formerly abundant. Mr. Pierce has only found one at Liverpool.

13. *VANESSA C-ALBUM*.—Mr. Decie does not understand how any escape the hop-picking in Herefordshire. I have had larvæ from that county found both on nettle and currant. It has gone from the hop districts of Kent. It left Dorsetshire in 1816.

14. *VANESSA CARDUI*.—I believe this species is much indebted to immigration for its frequent abundance. It seems to disappear for years from various places, sometimes it is not seen anywhere; then a large flight reaches us, it is common everywhere for a time, and again disappears.

15. *LIMENITIS SIBYLLA*.—Mentioned by Mr. Clifford as fast decreasing in numbers. I have no personal knowledge of it. It does not occur in the North of England.

16. *APATURA IRIS*.—Coupled with the last by Mr. Clifford. Its greater abundance in collections is accounted for by our better knowledge of its habits.

17. *SATYRUS ÆGERIA*.—Mr. Clifford believes the sluggish habits of this insect partly accountable for its scarcity. Sluggish or not, it does not occur here as it did formerly. Mr. Pierce took one in the centre of Liverpool.

18. *SATYRUS MEGÆRA*.—Mr. Clifford says this is decidedly less plentiful in Kent, Middlesex, and Surrey. Its "increasing scarcity" was specially commented on at the Haggerston Entomological Society's meeting in March, when my paper was discussed. Mr. Pierce finds that in the Liverpool district it had spread considerably last year. What has he to say about 1885?

19. *SATYRUS HYPERANTHUS*.—It is quite gone here, and "from several of the parks and copses near London, once its abode." In Kent, it has "markedly fallen off in numbers."

20. *CHORTOBIUS PAMPHILUS*.—No further remarks to make.

21. *POLYOMMATUS DISPAR*.—Extinct.

22. *POLYOMMATUS PHLÆAS*.—The increasing scarcity of this species was commented on at the Haggerston Entomological Society's meeting in March last.

23. *LYCÆNA ADONIS*.—"Much scarcer, and in some seasons very few indeed are captured."

24. *LYCÆNA CORYDON*.—Mr. Clifford says this species is much scarcer, but the larvæ were offered this season at 2s. per 100, not a sign of scarcity.

25. *LYCÆNA ACIS*.—Disappeared from Dorset in 1839. Mr. Dale tells us it used to be even more common than *Alexis*.

26. *LYCÆNA ALSUS*.—Though there is no doubt this insect has disappeared from many places, a statement confirmed by Mr. Clifford, I must modify my remark about this district. It certainly no longer occurs where we were in the habit of taking it, but my friend, Mr. Gardner showed me a locality for it but a very few miles from the old places, where it was this year in great profusion. It has not therefore left the district entirely.

27. *LYCÆNA ARGIOLOUS*.—Mr. Decie thinks this species is becoming more numerous in Herefordshire. Mr. Clifford says it now rare in Kent and Surrey, though formerly nearly as abundant as the Common Blue.

28. *LYCÆNA ARION*.—Mr. Decie confidently expects this to widen its now restricted range in the next few years. May his "great expectations" be realized, though I fear the wish is father to the thought.

29. *HESPERIA SYLVANUS*.—No one confirms my remark on this species. Mr. Clifford finds it as common as it was thirty years ago. It is gone from here anyhow.

30. *HESPERIA LINEA*.—Mr. Clifford calls attention to the fact that Newman in his "British Butterflies," noted that this species had gone from many of its old localities, and adds that it is much less common in Kent.

The list of species, therefore, that are presumably disappearing has increased to 30, though I have omitted *Thecla pruni*, which will probably be restored to the list, when some one who has taken it communicates. *Lycæna acis* seems gone altogether, but may turn up again, and for the present, at anyrate, *Polyommatus hippothoe* may stand alone as extinct. The immigrants that do not breed here do not seem to require any addition. The fact that single specimens of one or other of them has now and again bred here does not militate against the general conclusion. Both larva and perfect insect of *Danaïs chrysippus* have occurred in England, but no one thinks of adding it to our lists, although it is one of the likeliest species to establish itself, being world-wide in distribution, and of strong migratory habits. As an immigrant that breeds here but seems unable to perpetuate its race, I am inclined to place *Pyrameis cardui*. Its periodic abundance and recurrent scarcity or disappearance, like the two Clouded Yellows, seems to be explainable on no other hypothesis. That it does migrate in large numbers is well known. But there will not be many to agree with me in placing it here I doubt. The other two headings are the same, only differing in degree.

The bulk of the readers of the *Young Naturalist* are beginners, without the long experience that can give us dates back to 1815 and 1816, as Mr. Dale does from his father's diary. If the subject is to be pursued further, might I ask all our readers to communicate anything they have observed, or know from others, and if they would give periodical reports of the abundance or scarcity of all the butterflies they take, we would soon have a mass of information from which correct conclusions could be drawn. The worst of it is that collectors are so apt to think their notes not worth publishing. This is a great and growing evil, and those of us who remember the immense impetus given by the publication of the *Weekly Intelligencer*, would gladly see notes and captures in much larger proportion than we get them in any of the magazines.

THE LEPIDOPTERA OF LONDON.

By ERNEST ANDERSON.

(Continued from page 139.)

We now come to the Geometræ, the first of which *U. sambucata* (Swallow Tail moth) is frequently observed on summer evenings, coming in at our open windows, or boldly dashing round our gardens. The larvæ principally feed upon ivy, and live throughout the winter, but are very rarely noticed as they so exactly resemble the ivy stems, that even when searched for by experienced lepidopterists they are hard to find, but they are easily reared from the ova, and are very good examples of the "stick" larvæ of this division. The pupa is enclosed in a loose silken mesh, which is suspended from a twig or leaf, swinging about freely at the slightest touch, in this precarious position it remains a very short time, the imago emerging in about 12 or 14 days. *R. crataegata* (Brimstone moth) is fairly abundant where hawthorn trees are grown, first appearing in May and being found throughout the summer, there being several broods; it is a conspicuous species at dusk, and also comes to light, being accompanied sometimes by *C. elinguaris* (Scolloped Oak) which, however, is by no means so common, though the large larvæ are frequently observed in the spring making havoc of our lilac bushes. It is curious to note that these town-fed larvæ are of a uniform sooty black colour, instead of the usual pretty colour with markings down the back. The moths, however, produced from them, in no way differ from the ordinary type. This species is well worth breeding, and the ova are easily obtained, but it must be remembered that though laid in autumn, they do not hatch until the following spring; a fact that seems to be unknown to many young naturalists, as I have heard of one or two broods being thrown away in disgust as unfertile, through this lack of knowledge on the part of their owners.

Of the Thorn moths, *E. angularis* is perhaps the only representative, but some very fine forms are occasionally taken in our parks, I am afraid, however, that this species is rapidly disappearing, the great attractions light has for the perfect insects proving fatal to many.

The next species, *P. pilosaria*, I mention with some doubt, as the only record I have of it is the solitary specimen mentioned at the commencement of this article in the May number. Emerging as it does in the early part of the year, long before the town lepidopterist thinks of commencing operations, it is very likely to be overlooked. I shall be very glad to hear of it from other parts of London.

There is no doubt about our next species being a true Londoner, since one of its common names is derived from the fact, I refer to *B. hirtaria* (Cockney

moth or Brindle). This species appears yearly in great abundance during the month of April, being found upon the trunks of trees. Limes, elms, and acacia are the most productive, and they also rest upon thick stems at the at the base of lilac and privet bushes, three and four pairs "in cop" being frequently observed on one tree. It is a most sluggish species, the females seeming to hardly ever to use their wings. I once observed a female which remained in exactly the same spot for twenty-three days, and it would probably have stayed there longer had I not disturbed it in order to see whether it was still alive. From the observations I have made, I should say that the female deposits the whole of her ova within a very small space, always in a deep cleft, or thrust under a loose piece of bark, so that they are not frequently observed in the open, though of a very conspicuous bright green colour; the quantity laid by a single female is something enormous, and were it not for the great number of larvæ which perish through the attacks of birds and ichneumons this species would soon increase to a disastrous extent, fortunately, however, large numbers perish from these causes. The larvæ, when young, are extremely active, and quickly ascend and spread themselves over the trees; when nearly full fed they are fond of swinging by a silken thread, or stretching themselves out at full length on the trunk and under sides of the large branches, being apparently of a gregarious disposition as ten or a dozen may frequently be seen stretched out side by side. When examined, a large number will always be found having the little white spots, which denote the presence of ichneumon larvæ.

Leaving this interesting species, we come to *A. betularia* (Peppered moth), which is one of our good insects, the pupæ may be dug during the winter months, at the foot of poplars, upon which the long straight larvæ feed during August. The perfect insects appear in June, and are not very frequently seen, most of the London specimens being of a very large size.

BRITISH BIRDS: THEIR NESTS AND EGGS.

By S. L. MOSLEY.

69. CIRC BUNTING.

Emberiza cirlus, Linn.

CIRLUS—?P

Size.—Length $6\frac{1}{2}$ in., expanse, 10 in.

Plumage.—The male in summer plumage has the bill bluish lead-colour; eyes hazel; top of head and neck dark olive, the former streaked with black; a dark stripe runs through the eye, and a bright lemon one above and below;

back bright chestnut brown, some of the feathers having a dark stripe down the centre; lesser wing-coverts dusky, with lighter points; greater wing-coverts, and tertials, blackish with chestnut edges; primaries blackish with narrow yellow edges; upper tail-coverts pale olive; tail blackish, middle feathers tinted with olive-red; two outside pairs being partly white on the inner web. On the throat is a triangular black patch, with a bright lemon crescent-shaped patch below it; across the breast is a broad olive band, which joins the same colour behind the head; below this is a chestnut band, broad at each side and narrow in the middle; under parts dull lemon streaked with olive at the sides.

IN WINTER the colours are less bright, and the black feathers of the throat margined with light colour.

THE FEMALE is without the black patch on the throat, and the yellow crescent below it. The head, back, and under parts are also streaked with black.

"Many people find a difficulty in distinguishing the female of this bird from that of the Yellowhammer. In the Yellowhammer the base of the feathers of the crown of the head are always yellow, in this bird they never are; the feathers being olive-green, more or less striped with black. The rump feathers are not chestnut coloured, like those in the Yellowhammer."—F.B.

IMMATURE BIRDS are similar to the females, but are entirely without yellow on any part.

VARIETIES.—The only variety I have seen, is one from Mr. Bond's collection, which is nearly all white.

Note.—The song is said to resemble that of the Yellowhammer, but is quicker and cut short at the end. The male sits on the top of some tall tree, and pours forth his song. That of the female is simply a call-note.

Flight.—Similar to that of the Yellowhammer.

Migration.—This species is resident in England throughout the year.

Food.—The food of this bird is similar to that of the Yellowhammer, consisting of seeds, berries, grain, and insects. The young it is said, are fed principally upon grasshoppers.

IN CONFINEMENT, young birds have been reared successfully on a paste made of the berries of the woody nightshade (*Solanum dulcamara*), wheat flour, and fine gravel.

Habitat.—The Cirl Bunting was only distinguished as a British bird in 1800, by Col. Montague. Since then it has been found to inhabit nearly all southern counties of England, and to breed in many of them. It is, however,

a local bird, and nowhere numerous. Stray individuals, most frequently in winter, have found their way into the midland counties, less often to Yorkshire, and one has been met with as far north as Banff.

ABROAD it is met with in the South of Europe. In Holland, Belgium, and Heligoland it is only a rare visitor. It is more or less common in the South of France, Spain, Portugal, the Crimea, and Algeria.

Nest.—The nest is placed in a bush, just above the ground, or sometimes on the ground itself, on a sloping bank. It is composed of dried stems of grass and moss, lined with bents and hair.

Eggs.—Four or five is the usual number. They resemble those of the Yellowhammer, but are rounder, and have the markings usually more defined, there not being so many continuous fine lines, they being mostly short, and ending in a dot. The markings are black, and seldom shaded so much with brown as in those of the Yellowhammer.

VARIETIES occasionally occur without any markings.

REVIEW.

Notes on Lepidoptera observed in the Neighbourhood of Sandridge, Herts.—By A. F. GRIFFITH, M.A.

This is a list of very different character to that reviewed some little time ago, "A List of Yorkshire Lepidoptera," by Mr. G. T. Porritt. That was a complete county list, and included the work of all Yorkshire collectors, who had recorded their captures, with localities and other particulars. This is a record of the species taken by the writer and his brother "in a district about six miles long and two miles wide, having the village of Sandridge at about its middle point." It appears to be the first attempt at a catalogue of Hertfordshire Lepidoptera that has yet been made. The writer says that the Rev. F. O. Morris, in his "British Butterflies," records but six species for it, and one of these (*C. davus*) is an error. Stainton does not mention a single species in his "Manual," and Newman passes it also in silence. Yet Mr. Griffith's list shows that the county of Herts is by no means wanting in Lepidoptera. It does not include the Tineina, yet these two gentlemen, within the 12 square miles over which they have collected, have managed to find no less than "514 species out of a total of about 1350 known to occur in Great Britain." The introduction to the list is of considerable interest, briefly describing the features of the county, noting the best places for collecting, and a few of the more interesting species likely to

be found there. The list itself, though confined to so small a portion of the county, does not pretend to be complete.

"My brother and I have yearly added a considerable number of species to it. Last year we added over 15 species; and the great variety of sub-soils, which makes it necessary to hunt each locality thoroughly, at the same time makes it highly improbable that more than a part only of the species inhabiting this division have as yet been observed. In fact, scarcely any of the numerous inhabitants of fir woods, and none of the alder-feeders, figure in our list at all."

Besides this they have never sugared, nor used "light."

"The Rivers Lee and Ver run through parts of our district, but night-work is very necessary for marsh insects, and this we have not attempted. Near Hatfield are some capital reed beds."

Taking these matters into consideration, the limitation of their list to the captures over so small an area, and the neglect of so successful means of obtaining insects, we think the list is an excellent one and shows good work.

There is just one point where we may suggest an improvement in any future lists of the kind. We would have liked to see some mark after each name, that would have informed us of the abundance or rarity of the species. Mr. Stainton's well-known marks "!" and "!!", the first signifying that the species occurs there regularly, and the second that it is abundant, would have added much to the value of the list.

The species themselves do not call for special remark. Being the captures actually made by the gentlemen themselves, it does not contain any very great rarities, which as often as not are picked up by non-entomologists. But it contains several very good insects, nevertheless, and those which deserve special mention such as *Colias hyale*, *Heliothis armigera*, &c., are referred to in the introductory remarks. If similar lists were published by every collector in Britain it would add enormously to our knowledge.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

THE meeting of this society, held June 25th, was very well attended, and a large number of exhibits were on the table. Amongst these I may mention *P. hamula*, *D. coryli*, *N. lucina*, *Y. impluviata*, *C. plantaginis*, *E. albulata*, and many others shewn by Mr. Sheldon. A very fine lot of *S. irrorella* by Mr. Russell, and *A. promutata*, *E. subnotata*, and a carpet unnamed, supposed to be a local form of *C. ferrugata*, from North Devon, by Mr. Thornwaite. Mr. Hockett brought up two fine varieties of *A. grossulariata*, and Mr. Clark shewed bred *A. prodromaria* remarkable for their large size. Mr. Cripps exhibited *Cincindela campestris*, and Mr. Lewcock also brought up a very fine lot of Coleoptera.

The discussion for the evening was the life-history of *M. artemis*, the subject being introduced by Mr. Anderson, who brought up specimens of the larvæ and perfect insect. Reference was made to the large swarms of larvæ which occasionally occur, and Mr. Gates spoke of having taken the species at Hornsey, Croydon and Wanstead some years ago. The species is not now found very near London.

At the following meeting, July 2nd, Mr. May exhibited a series of *M. cribella*; Mr. Pearson shewed a series of *A. selene* from Brentwood, and Mr. Anderson brought up a series of *H. lupulinus*, *A. unanims* and others from Hackney Marshes. Mr. Cripps also exhibited five specimens of *Telephorus lateralis* from Rainham; Mr. Lewcock mentioned that he considered Rainham was the true locality for many species put down on the lists for Dagenham and West Ham, and regretted that some entomologists should endeavour to create difficulties in the way of brother workers. Mr. E. Cooper then opened a discussion on *M. cinxia*, and gave a very practical and exhaustive account of its habits as observed by him at Yarmouth, and in the Isle of Wight. Several members spoke regarding the species, and Mr. Lewcock recorded having taken two specimens on Farnham Common.

The meeting of July 9th was not very well attended. Mr. Hockett shewed a very fine lot of *A. prunaria* bred in confinement for three generations, the specimens shewed no signs of degeneration, and he also brought a beautiful lot of varieties of *A. grossulariata*. Mr. Russell exhibited *A. caja*, *P. cytisaria*, *A. pinguinalis*, *M. tristata*, &c.

At the meeting of 16th July the president announced that he had obtained four specimens of *E. crocealis*, from Hale End, and also a great many other species from the same locality. Mr. Lewcock mentioned having visited several localities in Surrey, and had taken *Donacia semicuprea*, *D. lemnae*, *Malachius aeneus*, *Leptura livida*, *Cleonus nebulosus*, &c. There was no discussion.—ERNEST ANDERSON, Sec.

OUR LONDON LETTER.

We are now in the height of the season, and reports from all parts of this district shew that entomologists are busy at work, so numerous, indeed, are the species now on the wing that one is at a loss to know what to mention. I hear of some very good varieties having been bred or captured of *A. caja*, *A. grossulariata*, *P. syringaria*, and the Ermines. At Box Hill *S. irrorella* has been exceedingly abundant, and *T. pastinum* and other good species, such as *C. porcellus* have been taken in fair numbers. The larvæ of the

Sharks also have been observed there in the usual quantity, and it is to be hoped that this favourite locality of London entomologists will not be enclosed as is threatened.

Epping Forest too has been very productive, *A. prunaria* being very common in the early part of July, and even last evening I observed several males flying about the rides. *T. amataria*, *P. syringaria*, *A. flexula*, *M. rubiginata*, *C. fulvata*, *M. arcuosa*, *A. osseata*, *A. selene*, and a host of other species are mentioned as having been taken there, whilst London entomologists just returned from the New Forest report *S. sibylla*, and *A. paphia* to be full out.

Coleopterists too have been very busy as a glance at the records of the Haggerston Entomological Society will prove. Mr. Lewcock's indefatigable work among the genus *Donacia* is especially to be noted. He has also turned up the larvæ of *N. typhæ* in two localities near London, whilst working for the aquatic coleoptera.

London, 20th July.

NOTES AND OBSERVATIONS.

COLEOPHORA VIBICIGERELLA BRED.—I have much pleasure in recording that up to the present time seven specimens of the above insect have emerged in my cages, and I still hope to breed more, for they appear singly, and at intervals of two or three days. The first specimen emerged on June 27th, one on the 30th, and one more every two or three days since. The larvæ, of which I found about thirty cases last autumn, were feeding on *Artemisia maritima* in the salt marshes on the Essex coast; it was a long, curved, black case, rather flattish, about 6 lines in length, the upper half of the case thin and narrow, the lower half very much bellied. When full fed, the case resembles very much the small cases of *C. conspicuella* or the stout cases of *C. pyrhalipenella*; they remain fixed to the main stems of the food plant during the winter, and begin moving about the end of February, and feeding till the end of May, or the first week in June, the imago appearing the end of the month to the middle of July. I found a few of these same cases in the autumn of 1883, but forgetting all about them the following spring they of course died through wanting the necessary food.—GEO. ELISHA, 122, Sheperdess Walk, City Road, July 14th, 1885.

COLIAS HYALE.—It will be of great interest to the readers of the *Young Naturalist* to hear that a specimen of the above insect has been captured in this neighbourhood. Mr. C. E. Ferry, a young collector captured one on

the 4th inst., at Babbington, near Ilkeston; he has shown it me to-day, it is good condition, and quite fresh. The appearance of this insect so far inland cannot be put down to a specimen that has been blown over from the continent, the wind which had been about that date, generally in a westerly direction, being against that theory. Is the bright, hot weather we have been having, going to bring us another of the mysterious visits of this insect? If this is so it is to be hoped it will not come alone, but will bring its near relative, *C. edusa*, with it in sufficient numbers, and that the problem as to their periodical appearance may be at last solved.—JOHN HILL, Whittaker Lane, Little Eaton, Derby, July 10th, 1885.

VARIETY OF *TRIPHENA PRONUBA*.—On the first of July I bred a curious variety of *pronuba* from a pupæ belonging to my friend G. A. Harker of Crosby, who is at present away from home. The fore-wings are the ordinary dull reddish-brown colour, but the left hind wing, instead of being like the right one, the usual bright yellow with a black band, is a *silvery buff* colour, with the band apparently dusted over with buff scales, which gives it a very peculiar look. The body is lighter than the type.—F. N. PIERCE, 143, Southdown Lane, Liverpool.

CHÆROCAMPÆ NERII AT HARTLEPOOL.—It is the early bird that catches the worm. My friend, Mr. John Gardner, called upon me on Thursday, 23rd July, a little after seven in the morning with a specimen of this rare Hawk Moth, that he had just found on the palings at the entrance to his timber yard, in the centre of the town, and I had the pleasure of seeing it alive. It is in fairly good condition, rather faded in colour, and is a grand addition to his collection, and to our local fauna. Not less than six men had passed into the yard without noticing it before Mr. Gardner arrived. JOHN E. ROBSON, Hartlepool.

TO CORRESPONDENTS.

T.R.B.—Your pupa is probably that of *Hepialus lupulinus*, but it is impossible to say with certainty, in the state it is in.

W.G.—You may place Napthaline loose in your drawers if you like. The flakes are not only small and light, but they adhere slightly to whatever they are on, and after a day or so will not readily move about. If you collect *Micros* you had better not put it loose in the drawers containing the smaller species. We do not think it will kill mites, but it keeps them out of our drawers.

T.G.W.—We have not seen any insects mounted by Mr. Coverdale's method of setting without pinning. Send him a box and return postage and he will send you a specimen. His address is G. Coverdale, Esq., 24, Fleming Road, Lorrimore Square, London, E.C.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

SEPTEMBER.

Bright summer-time is giving place
To autumn's cloudy skies,
But yet the myriad insect race,
Beetles, bees, and hovering flies,
And gaily painted butterflies,
Which nectar suck from many a flower,
Still charm the nature-lover's sight,
And at the quiet evening hour
The moths come forth with noiseless flight.

I think there is nothing prettier in the eyes of an entomologist than a bed of Michaelmas daisies, when on a bright September day the flowers are covered with insects. I have many times seen Tortoiseshell, Red Admiral and Peacock butterflies, almost swarming at these blossoms on a sunny day in the autumn, with perhaps one or two Common Blues and Small Coppers, while numerous bees and hoverer-flies have helped to make up such a crowd of insects that the flowers have been almost completely hidden. And at night the moths have held gay revels and have swarmed at these asters in my garden, even to a greater extent than their day-flying brethren, and have thus afforded evidence that the number of lepidoptera in the imago state is not yet much diminished. And, in truth, a great many species may be observed most of which, however, have emerged from the pupa state in previous months. I will merely mention the very rare *Vanessa antiopa* and *Argynnis lathonia*, the Speckled Wood (*Satyrus aegeria*), stragglers of which may still be met with, the Death's Head and Convolvulus Hawk-moths (*Acherontia Atropos* and *Sphinx convolvuli*); *Ennomos tiliaria*, *E. fuscantaria*, *E. erosaria* and *E. angularia*, all of which come to light. *Hydræcia micacea*, *Noctua glareosa*, *Anchocelis rufina*, *A. pistacina*, *A. lunosa*, and all the members of the genus *Xanthia*.

The lepidopterist will probably in September give much of his time to larva-hunting, inasmuch as the number of caterpillars is now very large and one may be fully occupied seeking them. Several kinds may be taken towards the end of the month fully grown, and may be boxed if desired as they are wandering about, seeking for a favourable spot in which to assume the pupa state. I shall be able to mention only a portion of those which may be found this month, but many of those omitted will be found described or enumerated in the last volume of this magazine (See *Young Naturalist*, Vol V. p.p. 227 to 230 inclusive.)

On maple saplings we may search for the larvæ of *Gelechia scriptella* and *Lithocolletis acerifoliella*. The first named of these feeds in turned down leaves, the other mines the underside in a small whitish blotch. A figure was given of it with the number of the *Young Naturalist* for July 1884. Very rarely *Gracilaria hemidactyella* may also be found on maple, but it is more likely to be met with on sycamore. It forms a cone at the edge of a leaf, as much as an inch long when the larvæ is full-grown, which is the case in the early part of September, and when ready to assume the pupa state it makes a flat, smooth cocoon of a yellowish-white colour, paper-like in texture, and of an elongate oval form. This cocoon is so transparent that the pupa can be readily seen through its substance. The moth, which appears later on in the month, is about half-an-inch in expanse of wings, of a pale ochreous colour, marbled with a reddish shade and having a distinct costal triangle which does not cross the fold; there are also some small fuscous-coloured spots on the costal margin. It is not at a common species, and I have not seen specimens from anywhere else than the south of England, where it seems to have a predilection for the coast. The pretty caterpillars of *Acronycta aceris* also feed on sycamore, and are full-grown in September. They are of a buff or flesh-colour, with long tufts of yellow or orange-coloured hair symmetrically arranged close together along each side, and have a row of lozenge-shaped white spots down the back. Under the bark of sycamore trees may be found the dull white larvæ of *Ephippiphora regiana*, but it is perhaps best not to collect them until they are full-grown in October. They may be found in most places.

The larvæ of the Prominent-moths are among the September caterpillars. Thus, for instance, we find the rather variable larvæ of the Pebble prominent (*Nododonta ziczac*) on poplars and willows. It has a pyramidal protuberance on the back of each of the sixth, seventh and eighth segments, and three pale stripes on each side, on a ground colour of either ashy-grey or violet-grey, or sometimes reddish-brown. The caterpillar of the Swallow Prominent (*Notodonta dictæa*) is sometimes of a dull brown colour, but generally it is

whitish green, with a yellow stripe on each side. Like that of the Pebble Prominent it feeds on poplars, and may also be found on willows in its localities. The somewhat rare Lesser Swallow prominent (*Notodonta dictæoides*) feeds on birch, and is deep brown with a purplish tinge, and has a broad yellow stripe on each side.

Other larvæ feeding on birch are those of the Birch Mocha (*Ephyra pendularia*), the White Wave (*Cabera pusaria*), the Miller (*Acronycta leporina*), the quaint looking Lobster (*Stauropus fagi*), and the Coxcomb Prominent (*Lophopteryx camelinæ*), together with those of *Acronycta auricoma*, *Notodonta tritophus*, *Platypteryx lacertinaria*, *Cymatophora duplaris*, *C. fluctuosa*, *Tinea distrigella*, *Incurvaria pectinella*, *Swammerdamia, griseo-capitella*, *Gelechia protimella*, *Atemelia torquatella*, *Ornix betulæ-tella*, *O. Loganella*, *Lithocolletis ulmifoliella*, *L. cavella*, *Nepticula luteella*, *N. argentipedella* and *continuella*. *Bistrigella* makes at first a linear mine, and then a large blotch in which it cuts out an oval case; *pectinella*, when full-grown, cuts out a flat case and descends to the ground. The first-named of these is pale yellow, *pectinella* is dull whitish, *griseo-capitella* is pale green. *Protimella* feeds in turned down leaves; I have never seen *torquatella*, and know nothing more about it than the fact that it is reputed to feed in elm and birch leaves, and I may the same of *betulatella* and *Loganella*. *Ulmifoliella* makes small mines on the underside of the leaves, and *cavella* large ones, *luteella* makes long contorted galleries, *argentipedella* dark brown blotches, and *continuella* long dark green galleries.

Besides the larvæ of *ziczac* and *dictæa*, those of *Smerinthus populi*, *Cerura bifida*, *Notodonta tritophus*, *Pterostoma palpina*, and *Cymatophora* or feed on poplar, and *Lithocolletis comparella* and *Nepticula trimaculella* mine the leaves. The first named of these two micro-lepidoptera makes a blotch on the underside of the leaf, the other mines it in broad galleries.

In addition to the caterpillars of the Swallow Prominent, we may find on willows the pale whitish-green larvæ of the Small Seraphim moth (*Lobophora sexualista*), and occasionally those of the Emperor moth (*Saturnia carpini*). The Great Goat moth caterpillars (*Cossus ligniperda*) also come out of their burrows in September when full grown, preparatory to assuming the pupa state. The little cones of *Gracilaria stigmatella* should be searched for on the leaves by those who study the micro-lepidoptera.

Another larva feeding in September on willow is the local *Pempelia hostilis*. I have not myself met with it so am unable to describe it from personal observation, but it is said to be "whitish green with several paler stripes, spots black" (Treitscke, quoted by Stainton.) It is reputed also to feed on poplar.

On Sallows may be found the larvæ of *Cabera exanthemata* (yellowish green, with white spiracular line), *Macaria alternata*, *M. notata*, *Lobophora sexualista*, *Lomaspilis marginata* (dark green with slender dorsal and subdorsal lines and broad spiracular line), *Scotosia undulata* (grey with white lines), *Clostera reclusa* (grey with yellow spots and a double yellow line along the spiracles), *C. curtula* (reddish grey when full grown with orange-yellow warts on each side and black tubercles on the fifth and twelfth segments), *Pterostoma palpina*, *Pygera bucephala*, *Gelechia notatella* (between united leaves), *Lithocolletis spinolella* (in a blotch on the underside), *L. salicicolella*, *L. viminiella*, and *Nepticula salicisella*.

The curious Lobster caterpillar (*Stauropus fagi*) with such remarkably long fore legs is occasionally found on beech trees, and still more rarely, on birch and oak. Other beech-feeding larvæ are *Notodonta dictæoides*, *Demas coryli*, *Drepana unguicula*, *Limacodes testudo*, *L. ascellus*, *Lithocolletis faginella* and *Nepticula tityrella*. The last named makes rather broad galleries.

The remarkable larvæ of *Limacodes testudo* and *ascellus*, of which mention has just been made, are most commonly found on oak trees. They only occur, I believe, in the south of England, and chiefly in the New Forest in Hampshire. Their form is most peculiar, as they have no visible feet and crawl like snails. Oak trees seem to be great favourites with caterpillars, as quite a large number may be found feeding on their leaves. The list includes the previously mentioned *S. fagi*, *D. coryli*, *P. dictæa* and *C. curtula*, together with the rare *Peridea trepida* (yellowish green, with two white lines along the back and an oblique and yellow stripe on the side of each segment; *Diphthera orion* (with silky hairs, reddish grey in colour, sometimes yellowish grey, with a broad black stripe down the back, on which are large oval pale yellow spots); the common Buff-tip and Pale Tussock caterpillars (*Pygera bucephala* and *Orgyia pudibunda*), *Anchylopera Mitterbacheriana* (dull green in colour, with yellowish brown head and yellowish-looking second segment); *Gelechia triparella*, the cone making *Gracilaria Swederella*, *Ticheria dodonæella* and *complanella*. The last two mine the leaves and are both similar in colour, i.e. yellowish; *dodonæella* has a reddish brown head and makes brown blotches, *complanella* has a pale head and makes white blotches. The larva of *Gelechia triparella* is yellowish green, with a pale brown head and black spots on its body. It spins a silken web with which it fastens two oak leaves flat upon each other, and gnaws their cuticle in a serpentine manner, forming a crooked silken gallery. I believe it is pretty generally distributed and fairly common in many places.

Lithocolletis amyotella, *roborella*, *hortella*, *Cramerella*, *Heegeriella*, *irradiella*, and *quercifoliella* all mine the underside of oak leaves; and other

micro-lepidoptera feeding on oak leaves are *Bucculatrix ulmella*, *Nepticula atricapitella*, *N. ruficapitella* (which makes slender galleries), and the pale greenish white *N. sub-bimaculella*, which mines the leaves in small blotches.

The white black-spotted larva of *Abraxas ulmata* feeds in September on elm, it has a pale yellow line along the spiracles and a black head; the dull dark-red *Atomelia torquatella* lives inside the leaves; *Lithocolletis Schreberella* and *tristigella* also burrow in the leaves, making mines on the underside; *Nepticula marginolella* and *viscerella* too feed in the interior of the elm leaves, the latter making a contorted blotch-like mine. The green caterpillar of *Melanthia albicillata* feeds on bramble and also on raspberry, it has eight triangular red spots on the back. *Bombix rubi*, *Thyatira derasa* and *T. batis* are other bramble-feeding larvæ, and *Lozotania musculana* feeds between the united leaves.

Cambridge.

BRITISH BIRDS: THEIR NESTS AND EGGS.

By S. L. MOSLEY.

FRINGILLIDÆ.

Genus 1. *Fringilla* LINN.

FRINGILLA—Latin for Finch.

Twelve species of this genus are found in this country, most of them common, but one of them is only a winter visitor. Three more have been met with as accidental visitors. Most of them exhibit very bright colours.

They feed upon seeds, grain, and insects.

The nests are usually compactly built, and the eggs are white or blue, with grey or brown spots or lines.

70. CHAFFINCH.

Fringilla cœlebs, Linn.

CÆLEBS (Lat.)—a bachelor.

Size.—Length $6\frac{1}{2}$ in., expanse $11\frac{1}{2}$ in.

Plumage.—The adult male in breeding dress has the bill bluish lead-colour; eyes hazel; next to the bill is a black patch; head on top, behind, and back of neck slaty-blue; below this is a patch of yellowish olive; back chestnut-brown; rump and upper tail-coverts yellowish-green; lesser wing-coverts white; greater wing-coverts blackish, with white tips; primaries blackish with narrow pale edges, and a white patch on the outer web of the

inner feathers; tertials with broad yellowish margins; tail dull black, the two middle feathers greyish, the outer ones with narrow white outer margins, a patch of white on the inner web, and the two outside feathers nearly all white. Throat and breast purplish-rose colour, shading to white at the vent. Legs and toes brown.

IN WINTER the whole of the colours are less bright, the white being tinged with yellow, and the blue parts obscured by the brown margins of the feathers.

THE FEMALE has the upper parts greenish-brown, with a pale spot behind the head. The green on the rump is not so bright as in the male. Throat and breast dull fawn colour, under parts dull white, shaded with greyish-brown at the sides.

IMMATURE BIRDS resemble the females, but are less bright in colour.

VARIETIES of this species are comparatively common.

WHITE OR PALE.—Some years ago my father had a white specimen brought to stuff, killed near Huddersfield. Two white specimens are in Mr. Marshall's collection at Taunton. One is in the York Museum which is white just tinted with local colours. One is reported (Zool. xix, 7392) with the "Head and back white, with the most delicate yellow tints over certain parts, and a few brown feathers on wings and tail; throat, breast, and under parts white, tinted with rose," killed in Norfolk. Mr. Bond has one of a lemon colour, and another pale drab, killed at Faversham, and a similar one killed in Sussex. Mr. Whitaker has a pale female, and a male with all the colours very much subdued. Another very pretty male is also in the same collection.

PIED.—Mr. Whittaker has several pied birds, one killed in Suffolk has the back of the neck white, the head, wings, and tail much pied. Mr. Bond has a very light male, killed at Weybridge, and another with white ear-coverts, and a female with a white head. Mr. Gregson has a very beautiful male, with the front all white.

DARK.—The only specimen I have seen darker than usual is one in Mr. Bond's collection, killed near Hammersmith. The same gentleman has also a male, which was kept for some time in the Zoological Society's Gardens, which had, when living, a bright yellow patch behind the head.

Note.—The male bird has a merry and pleasant song, which is commenced early in the year. Both sexes have also a call note, resembling the syllables "pink, pink," from which the local name of "Pink" or "Spink" has been derived.

Flight.—The flight is rather quick and undulating. This species has also the habit, in common with other small birds, of darting into the air after a passing insect.

Migration.—The Chaffinch may be found in this country throughout the year, but in the autumn large flocks, composed principally of females and young birds, arrive upon the east coast. These probably come from the North of Europe, and depart again the following spring. In many districts the sexes seem to separate in winter—hence the specific name—and flocks may be noticed composed almost entirely of one sex.

Food.—In winter the Chaffinch subsists largely upon small seeds, for which purpose they visit farm steads, stack yards, and stubble fields. In spring they resort to the newly-sown seed beds and pick up the uncovered seeds, especially those of turnip. They are also fond of young tender plants, and nip them off as soon as they show above ground. In summer, when the young are being fed, insects are used for that purpose.

IN CONFINEMENT the Chaffinch is a merry bird, is easily kept in a cage or aviary, and will eat small seeds of almost any kind.

Habitat.—This is a common bird in all parts of Britain, and breeds everywhere except in the extreme northern and western islands of Scotland.

ABROAD it is common in most parts of Europe, into the Arctic Circle. It breeds in all the middle countries, North Russia and Siberia. It is a winter visitor to Palestine, Egypt, and North Africa, but is rare south of the Mediterranean.

Nest.—The nest of this species is one of the most beautiful of any of our British birds. It is placed in the fork of a tree, against a tree side among small branches, in a fruit tree, or in a hedge row. It is round, compact, and composed of bits of dry grass, shreds of the inner bark of trees and moss. Cobwebs are also largely used in its construction, and bits of lichen are stuck upon them on the outside. Inside it is lined with horse-hair. It is rather deep and very well put together.

Eggs.—Five is the usual number. They are greenish-blue, shaded and dappled with reddish-brown, and purple spots and blotches. Sometimes the markings entirely cover the ground colour.

VARIETIES.—There is a variety not unfrequently met with of an uniform pale greenish-blue. Mr. Whittaker has a curiously shaped egg in his collection very long and narrow, and another very minute in size, being less than that of the Gold Crest. They were, I believe, both taken by his son—Mr. Joseph R. Whittaker, in the grounds at Rainworth Lodge.

71. BRAMBLING.

Fringilla montifringilla, Linn.

Berg-fink (Sweden).

Vintan (Lapland).

MONTIFRINGILLA.—*Mons* (L.)—mountain, *fringilla*—a Finch.**Size.**—Length $6\frac{1}{4}$ in.; expanse 10 in.

Plumage.—Male in summer, bill bluish-black; eyes brown; head, sides of neck, and back, black; scapulars orange; lesser wing-coverts orange, the lower row white; greater wing-coverts black, tipped with orange and white; primaries black, edged with lemon, a white patch on inner web; secondaries black, bordered with orange; rump white; upper tail-coverts black; tail black, middle feathers edged with grey, the two outer ones white on the outer web at the base. Throat and breast buff; belly white, spotted with black at the sides; under wing-coverts lemon-yellow; under tail-coverts yellowish-white. Legs and toes brown.

IN WINTER the colours are less bright and the back of the head and back is obscured by broad yellowish margins to the feathers, and the bill is bright yellow except the tip.

THE FEMALE has the bill horn-colour, the feathers on the head and back dark brown, with broad pale margins, which almost hide the dark colour. The wings and tail are more dingy in colour than in the male. Under parts similar to male but not so bright.

THE YOUNG are similar to the female, but paler and duller in colour.

VARIETIES.—Some specimens have the throat black, and Mr. Bond has one all white, except a few feathers in the wings.

Note.—The note consists of one syllable, resembling “cree, cree.”

Flight.—The flight resembles that of the Chaffinch, but this species may always be distinguished by the white rump.

Migration.—This bird is a winter visitor to this country, arriving about the middle of October, and departing again early in March.

Food.—This consists of seeds of various kinds, both stubble seeds and those of larger kinds, including those of the beech, of which this bird is said to be particularly fond.

IN CONFINEMENT the ordinary bird seeds in common use may be given. The Brambling has been known to breed in confinement.

Habitat.—This bird is found in winter, principally in the eastern counties, where it frequents farm-steads. Some seasons the numbers are only small,

but at other times they come in vast flocks. Sometimes they associate with Yellowhammers and Chaffinches.

ABROAD this is one of the commonest birds in the north of Europe in summer, and in winter is found as far south as Algeria. In Asia it has been met with on the Himalayas, and as far east as China.

Nest.—The Brambling breeds in Norway and Lapland, building a nest very similar to that of the Chaffinch. It is usually placed in a small fir, from six to ten feet from the ground, and is composed of fine straw and bents, mixed with moss, lichen, and pieces of wasps' nests, and lined with fine bents, and feathers of the Willow Grouse. Instances are recorded of this bird having bred in Britain, but there seems to be no substantial proof that such is the case.

Eggs.—From four to six eggs is the usual number, though sometimes as many as seven have been found in one nest. Mr. Wheelwright says "The eggs are very like those of the Chaffinch, but generally a trifle smaller, darker in the ground colour, and the purple lines and dots more coloured."—"Spring and Summer in Lapland," p. 298.) Mr. Bond informs me that he has seen eggs similar to the pale blue eggs of the Chaffinch.

A DAY AT LLANGOLLEN.

By R. WILDING.

(Read before the members of the Lancashire and Cheshire Entomological Society.)

Ever since April 1884, when together with Dr. Ellis, Dr. Dixon, and Mr. J. H. Smedley, I had such a pleasant and successful day at Llangollen, I have longed to repeat the visit. But it was not until Good Friday, April 3rd—for which day another of our Society's excursions was arranged—that I was able to do so. Lepidoptera is decidedly scarce so early in the year, and this probably accounts for the fact that Dr. Ellis and myself were the only members who elected to go. Although Lepidopterists, our chief object was to search for mountain Coleoptera, of which many good species were known to occur on the high moors which surround and give such a charm to the "Vale of Llangollen." I need scarcely say how anxiously we looked for a fine day. If working flat country is disagreeable in wet weather, working mountainous country under similar circumstances is next to impossible. On this score, however, we had no cause to complain, a bitterly cold and frosty morning preceding one of the grandest spring days.

We left Birkenhead at 7.25, and after a smart run, reached Llangollen at

9.30. On leaving the train, I found to my annoyance that I was minus my bag, which I recollected having unstrapped and placed on the rack in a train into which we entered by mistake at Birkenhead. Fortunately it was a Bala and Dolgelly train, and would call at Llangollen, so, as the bag contained all my "traps," there was nothing for it but to wait and hope it would turn up. The train arrived in half-an-hour and, much to my relief, the companion of many a pleasant entomological ramble had not been disturbed. Had it fallen into the hands of the Railway Co., speculation would have been rife as to who it belonged to. From the scores of pill and salve boxes which it contained, I might have been supposed to be a travelling "quack." But on the other hand, my collecting bottle, with a zinc tube running through the bung, looked suspiciously like an infernal machine, and I could not help calling to mind that on the occasion of our last excursion to this very place, the notorious "Dynamitard" Daly or Egan, I forget which, was arrested at Birkenhead station, not more than twenty minutes after we left. However there was no need to be alarmed, and I was not called upon to prove my fitness to be at large, or that my boxes and bottle were simply to be filled with "moppats" and "clocks."

We now hurried on to make up for lost time, taking the charming pathway along the canal bank. Twenty minutes walk brought us to the slate wharf, near which place a small stream rushed down from the hills into the Dee, like scores of others which help to swell the waters of this winding and noisy little river. On the banks of these streams, near their junction with the river, many of our rare and local Coleoptera have their haunts, particularly species of the genus *Bembidium*. We accordingly spent a short time here, and were rewarded with *Bembidium decorum*, *tibiale*, *atroceruleum*, *prasinum*, and a very dark form of the common *littorale*, which we took in hopes that it might on a closer examination prove to be *Bruxellense* or *testaceum*. The three species first named were taken near the same place on our last visit, but much more plentifully. *B. monticola*, *bipunctatum*, *paludosum* and, I think, *fluvatile* are also taken here, the last three towards autumn. A week might be very profitably spent in working nothing but the river banks from Llangollen up through the Berwyns, and I feel certain that many good species would be taken, if not something new to the British fauna. But to-day our destination is the mountains, and while we inwardly cry "Excelsior!" our "strange device," had we unfurled our flag, would have been seen to be "*Miscodera arctica*!" We each procured a stout hedge-stake, to help us along, for the Ruthin road soon began to assume a gradient not over pleasant to top-coated travellers, and the sun, although only an April one, was sufficiently strong to make hill-climbing uncomfort-

able. There was abundant evidence along this road of the lateness of the season as compared with last year about the same date. All the hedgebanks were then covered with a mass of primroses, but now scarcely a leaf, much less a flower, of this lovely spring favourite was to be seen. We reached the slate quarries at the foot of Moel-y-gamelin by twelve o'clock, where, after a short rest, we began work in earnest. The base of the hill is covered with a thick growth of heather, and as it looked a very likely place for *Cymindis vaporariorum*, we searched for some time, but without success. The heather on all the hills hereabouts seems to have suffered very much from the long drought in the summer of last year, but I should think this does not account for the absence of *C. vaporariorum*, which Dawson says is abundant about there in spring and autumn.

Not meeting with much success on the lower slopes, we began to make tracks for higher ground, but insects, even of common species, were very scarce, the majority owing to recent cold and wet weather, being still in their winter quarters where it was difficult to get at them. The first capture of note was *Pterostichus vitreus* made by Dr. Ellis, and a second falling to my share immediately afterwards, acted as a sort of stimulant, for, to my mind, nothing in Entomological work is so dreary and depressing as creeping on one's hands and knees up a mountain side, and turning over stone after stone without seeing a single insect which could not be taken within five minutes walk from your own door. The common *Pterostichus madidus* and *Nebria brevicollis* were frequently met with, and had to be carefully examined for fear of discarding *Pterostichus aethiops* among the former, or *Nebria Gyllenhalii* among the latter; they all, however, proved to be the common species—probably we were not high enough above the sea level for these mountain insects.

We had now got about half way up the east slope of the hill, when, on turning over stone number one thousand and one I took the gem of the day's out—a specimen of *Miscodera arctica*. This beetle has very probably not been taken on the Llangollen moors since Dawson worked them nearly thirty years ago, and as Dr. Ellis and Mr. J. H. Smedley have carefully searched for it on several occasions without success, we were not a little pleased to get it, although it *was* the "only one." Very soon a shout from Dr. Ellis announced the capture of the beautiful *Carabus arvensis*, which, if not quite so rare as *M. arctica*, was equally welcome; a second being taken by myself shortly afterwards. On arriving towards the summit, the slopes were found to be very boggy, and produced nothing except the usual dark forms of *Notiophili*, and the stones forming the cairn gave shelter to *N. brevicollis* only.

The craving for beetles having now somewhat subsided, we began to feel other cravings of an equally important nature, for, although not quite so done up as a friend of mine was on a similar excursion, when he declared he "could eat a cow on a bit of bread," we were decidedly both hungry and tired, so we sat down to discuss lunch and enjoy the surrounding scenery.

Moel-y-gamelin is 1897 feet high, or a little more than half the height of Snowdon, and commands a somewhat extensive view. Directly in front we had the valley of the Clwyd stretching away for miles; on the right the Moel Vamman range; on the left the Berwyn and Arran mountains; and at our backs the peculiarly shaped Eglwysag rocks, and still further away, the Wrekin in Shropshire. Although it was a little cloudy in the direction of Carnarvonshire, yet we were able to get an occasional glimpse of that distant peak which we hope sometime to explore, in search of the beautiful *Chrysomela cerealis* and other good things which are known to occur on the slopes of Snowdon.

Just as we had finished lunch, and were thinking of resuming work, we were startled to hear the explanation "Ah! we've run you to earth at last." On looking round we found the speaker to be Mr. A. O. Walker of Chester, who had followed in a later train, and knowing our proposed destination had succeeded in overtaking us. After a few minutes spent in comparing captures, we began the descent, but met with nothing new, and Mr. Walker left us as he wished to return by an early train, while we pushed on to examine another ridge, where, on our last visit we took all our best captures. Here, however, insects were equally scarce, and with the exception of a strange *Sitones*, not yet identified, we made no additions to our list. As it was now half-past five we began to retrace our steps towards the village, where, strange to say, we had only to wait about a quarter of an hour for tea—an hour being about the usual time.

Leaving Llangollen at 7.15, we were in Liverpool by 9.30, tired, but well satisfied with our trip, for a day among the hills—if the weather be fine, but not otherwise—is a treat, quite irrespective of the good insects we may expect to meet with. I sincerely re-echo the sentiments of the Welshman's song, when he says:—

"Oh in my heart how I love that Llangollen,"

though with a non-acquaintance with the young lady I may not be able to add:—

"And sweet Jenny Jones too, in my heart I do love."

THE LEPIDOPTERA OF LONDON.

By ERNEST ANDERSON.

(Continued from page 186.)

THE next of our town species, *H. abrupitaria* (Waved Umber) is of very general occurrence in gardens during May and the early part of June, sitting on fences, doors, etc., during day-time, and flitting round the lilac trees at dusk. Occasionally remarkable melanic varieties occur of this species, and Dr. J. S. Sequeira has a very extraordinary specimen which he captured at sugar, in his garden at Hackney, the wings of which are suffused all over with brownish black. The larvæ of this species feed during the autumn upon privet and lilac, and like many of the loopers are very similar to the twigs of the shrubs they inhabit. The cocoon is formed of small fragments of bark carefully joined together, and is generally placed in such a position as to appear part of the branch it is on, in fact, so beautifully are these cocoons made that it is almost impossible to detect them. We may dismiss this beautiful species with the remark that it seems to thrive well in our smoky town, and shows no sign of decrease, neither does the next on our list, *Boarmia rhomboidaria*, which is not nearly so conspicuous a species, although perhaps even commoner than the "Umber"; it is on the wing in June and July, and is fond of resting in dark corners. The larvæ hybernate when very small and feed up in the spring. They are not very frequently seen owing to their sluggish habits. Nearly all of our specimens of this insect are the dark suffused form, known as *perfumaria*, and considered to be a distinct species by some entomologists.

The little *Acidalia incanaria* is the only representative of its genus I have been able to meet with in town; it is not common, but is sometimes taken at dusk, and more frequently at rest on fences and door posts. I believe the larvæ feed upon ivy.

The Garden V. *Halias wavararia* is very common during June and July, being freely met with in all its stages, the larvæ being sometimes so abundant as to become a pest to our currant and gooseberry bushes; but it is more particularly the larvæ of *Abraxas grossulariata* or the Magpie Moth, which are so well-known as infesting these plants, frequently stripping them entirely of their leaves, the yellow and black pupæ hanging in exposed and conspicuous positions upon the bare twigs, fortunately there is only one brood of this handsome, but destructive insect, which appears during July.

Another very well-known destructive moth is *C. brumata*, the larvæ of which hatch in early spring, and feed on the buds of fruit and other trees, thus causing great damage, with us, however, it is somewhat scarce, the

London sparrows, no doubt, keeping it well in check ; the male moths may be observed in the parks from November to January, flying at dusk, or at rest on trees and palings. The apterous female can only be obtained by careful searching in the cracks of the bark.

We now come to the "Pugs" of which large family I have at present only observed two species, namely, *E. centaureata* and *E. vulgata*, the first appears during July and August, while the latter is found from May to September, both being fairly abundant. *E. assimidata* may perhaps also occur in some districts, but I have no definite record of it.

Of the "Carpet" moths we have only one species *M. fluctuata* (Garden Carpet), but this is exceedingly abundant everywhere throughout the summer. The larvæ are found in the autumn on various garden plants, being very fond of Indian cress. They rest with the interior segments coiled up, and drop from the food plant when disturbed.

This concludes the list of Geometræ, and we now turn our attention to those lovers of darkness, the Noctuæ. Of Noctuæ, the town collector will be able to make a very good show, there being a fair number on the list. The first is the well-known *Acronycta psi* (Dagger Moth), which is commonly met with on tree trunks during June and July, or it may be easily decoyed with the entomologist's "sugar." The larva, which makes a very good object for preserving, is found during the winter months, feeding on various trees, the lime and elm being favourites. When full fed it forms a cocoon of bits of bark, or rubbish of any kind. This species varies considerably in the colour of the anterior wings, some specimens being a beautiful silvery grey, while others are smoky drab, the dagger-like markings, however, are very constant.

Our next species is *Acronycta megacephala* (Poplar Grey Moth.) This is a regular inhabitant of Hackney. During the months of May and June it is observed in considerable numbers on the trunks of poplar and other trees, sitting with the wings folded up, and the anterior legs extended ; when thus at rest it forms a pretty object. The larvæ feed upon poplar, and occasionally on willow trees ; they are fond of resting upon the underside of the leaves, and on the trunks, always having their heads bent round so as to resemble a loop. When disturbed they hold very tightly to the bark, so much so that it requires some little force and skill to detach them. When full fed they form a compact cocoon in some cleft of the bark, covering the outside with little fragments of wood, etc., so that it is very difficult to distinguish. Occasionally they go underground, but even then they form a very strong case. The pupæ are very long, and of a bright red colour.

When freshly emerged these insects are frequently suffused with a rosy tinge, which has a very charming effect.

We can boast yet another *Acronycta*, namely *A. aceris* (Sycamore.) This species is rather scarce; it is found at the same time of the year as the other two, but should be searched for on sycamore trunks. The larvæ are even more vividly coloured than the last species, being adorned with brilliant yellow and red tufts of hair. When handled, these larvæ evince considerable annoyance, and will frequently bite the hand. They are found upon sycamore and horse chestnuts, being almost the only species of lepidoptera feeding upon the latter tree, which is singularly free from insect foes. Most of our other trees give food to several species, but a grove of horse chestnuts is but a poor spot for the entomologist. The larvæ construct their cocoons under loose bark, and amongst rotten wood, they have considerable power in their jaws, and construct a very firm and compact cocoon. This species is somewhat difficult to rear in confinement, and must be supplied with shavings and old bungs into which the larvæ will penetrate. They must not be disturbed from this retreat, the pupæ being very delicate, and the slightest damp is fatal to it, a remark which applies to most of the genus.

In reply to Mr. Anderson's remark in his last paper, I have taken two specimens of *P. pilosaria* from shop windows, and should without hesitation bring in a "true bill" in favour of its being a veritable London resident.—J. HENDERSON, Romola Road, Herne Hill.

OBITUARY.

On May 30th, 1885, JOSEPH SIDEBOTHAM, of Earlsden, Bowden, near Manchester, passed away. He, with his cousin Ashworth, were nearly the last to join the group of northern Entomologists who came to the front between 1835 and 1845 or '50, and who remained true to their first love to the end, and who did so much to clear our collections and catalogues of foreign species, introduced mainly in the interests of dealers, and so making the cabinets of the North of England collections of British insects only. Mr. Sidebotham, though he remained an Entomologist to the last, did not confine himself to it, but might well be called an "all round man." As an amateur practical astronomer, his private observatory, replete with every appliance necessary for accurate observation, gave him facilities for accurate observation that few private gentlemen possess. As a photographer he had no superior, and had mastered the art when it was generally little known.

This he used to gratify friends, and benefit science by distributing figures of unique or little known species, such as *Æcophora Woodiella*, to all whom he thought they might prove useful. As a painter on porcelain he was entitled to a high place. It was a double treat to enjoy his hospitality, one the bountifully supplied creature comforts so liberally supplied by his amiable wife, the other the admirably depicted figures of British insects, painted by himself, from specimens in his own magnificent collection, that ornamented every vessel. His talent in painting was also used in his Natural History diaries, which are models worth following by anyone. Thus when in his Continental travels he met with a species new to him, he depicted it carefully, and accurately on the margin of his note-book, which contained a description and copious notes. His collections are contained in several large cabinets, and are beautifully arranged. To his own collection he subsequently added that of his cousin Ashworth, at the death of the latter, and when Mr. R. S. Eddleston died Mr. Sidebotham purchased his collection also, and incorporated it with his own. He could thus show one of the grandest collections of rarities and varieties ever seen, all purely British specimens, not a single specimen in the entire collection being even of doubtful origin. His drawer of *Arctia caja* are all extraordinary varieties, and that containing *Abraxas grossulariata* is one of the most wonderful sights an Entomologist could have, every specimen being an interesting study, the variation ranging from pure white examples to many of the variety *Varleyata*, which are nearly black. His *Lithocolletidæ* and *Nepticulæ* are incomparable for quantity and quality, averaging thirty to fifty examples of each, the series being also illustrated by leaves of the various food plants, bearing traces of the larvæ and showing in what manner they had fed, thus giving the morphology of each species at a glance. His cabinet contains the only British pair of *Bryophila algæ* known. They were captured at Strines, near Manchester, by one of his own workpeople. Besides all that has been named Mr. Sidebotham was a good botanist. As an English gentleman he was perfect—liberal, bounteous, broad in his ideas, kind and courteous to all.

With Joseph Sidebotham dead we have lost all but the last of the old band of those amateur Entomologists who held their own through good or evil repute for fully half a century, and who made their mark in their day and generation. Joseph Sidebotham made the world happier and wiser than he found it, let those who are left try to do the same.—C.S.G.

VARIATION IN LEPIDOPTERA.

INTERMEDIATE FORMS.

By JOHN E. ROBSON.

Specimens presenting a marked departure from the normal type, have always been much valued by collectors, and since Darwin showed the importance of the subject, various explanations have been given more or less satisfactory to account for some of the phenomena. Mimicry of other species, assimilation in colour and appearance to the hues of the habitat or resting place, are among the more important suggestions. Lord Walsingham has recently, in a very important paper of which a lengthened notice will subsequently be given, argues with great force and clearness, that northern and mountain species of Lepidoptera are dark, because dark colours absorb heat more rapidly, and they thus mature more quickly; an important element in places where summers are shorter and the colds of winter prevail for a longer period, than in sheltered valleys or southern climes.

While these theories explain much of the change that appears to have taken place in years gone by, and that is still in progress, much remains to be explained, and without having any explanation to offer, I wish to direct attention to an important point in the investigation:—The general absence of Intermediate Forms, even of those species of which there are the largest number of permanent varieties.

That “like produces like” may be taken as a law lying at the very root of the cause that produces permanence of species. Yet it is equally true that like never produces like. No two specimens of anything, animal or vegetable, are ever so exactly the same as not to be individually recognisable by any one accustomed to their appearance. The lepidopterist looking down his rows of insects, can tell you where every specimen came from, recognising the difference between each. Yet he will look at a collection of coleoptera and think them all alike, being less accustomed to their appearance. The differences between individuals may be minute, and only the educated eye be able to observe it, but it is there always.

Besides these “individual differences” there are many others requiring consideration. The sexes, even in animals so low in the scale as insects, differ in appearance as well as in structure. The same species will vary according to locality, being darker or paler, larger or smaller, or changing in other ways. Some species have produced very distinct varieties, differing from the type in a marked manner, yet occurring with it, not perhaps in every place, but only in some. Others have produced equally well marked forms, that do not occur with the type, but have become the only form where they are found.

Others again have produced an immense number of different forms varying in all kinds of ways, yet establishing no permanent or constant variety. But wherever there are two well marked forms of an insect, whether sexual or otherwise, the absence or rarity of intermediate forms seems to require explanation.

The greater importance of the female in perpetuating the race need scarcely be commented on. After they have paired, the male has no more to do, and his immediate death is of no consequence. But the female has yet her ova to deposit, and until this has been accomplished satisfactorily the object of her existence is not fulfilled. That all differences existing between the male and female are, or have been, for the advantage of the latter, there can be no doubt. It may not be possible to explain, or understand how certain differences are advantageous. It is even possible that a form brought into existence under one set of circumstances, may continue to exist under changed conditions, thus rendering the problem still more difficult of solution. In some cases the importance of the preservation of the female has led to the production of more than one form of it. This curious phenomena was unnoticed, though several cases occur in Britain, and more in Europe, until it was observed that certain exotic butterflies, believed to be distinct species, and of which no males were known, were only forms assumed by the females of other species. Thus *Papilio pammon* has a male and female resembling each other, and a second form of the female long known as *Papilio polytes*. Another butterfly far from rare in India, &c., known as *Papilio romulus*, and of which no male is known, is probably, almost certainly, a third form assumed by the female of *P. pammon*. Other Indian or Malayan illustrations might be given, but perhaps that best understood is the case of *Papilio turnus*, a common North American butterfly. North of Latitude 37°, *Papilio turnus* is found with males and females, resembling each other very closely. South of this latitude, *Papilio glaucus*, a very different looking butterfly occurs, and was long believed to be a distinct species, but no males of it are known, and it is now well established as a dimorphic form of *P. turnus*. To the South of latitude 42° all the females are of the dark *Glaucus* form. North of Latitude 37° they are all of the yellower form. In the intermediate zone, both these varieties occur, and more singular still, both forms have been bred from the same batch of eggs. In our own country we have no such well marked illustration of dimorphic or trimorphic species as these, but *Colias Edusa* with its second form of the female, *Helice*; *C. Hyale* with its second female *Pallida*; *Argynnis Paphia* with its well-known form *Valezina*, may be named as instances that home collectors may obtain for their own study.

Leaving out questions of structure, sexual differences are not confined to butterflies. In most of Bombyces they are very marked. In Noctuæ they are generally slight, but the hind wings of the female are darker than those of the male in very many instances. In the Geometræ many of the females differ in a very striking manner from the other sex. Who for instance would suppose males of *Epione vespertaria* to be the same species as the females at first sight.

It is not necessary to go out of England for illustrations of well marked and permanent varieties not sexual. *Angerona prunaria*, in which the sexes differ considerably in colour, has produced a very distinct variety, common to both sexes, in which a broad dark border appears round all the wings. *Amphidasis betularia* has a well known black variety (*Doubledayaria*) also common to both sexes. Such species as *Xylophasia rurea*, var. *combusta*, *Hepialus velleda*, var. *carnus*, *Polia chi*, var. *olivacea*, and others are too well known to need comment. Some of the class of varieties of which these may serve as illustrations may be more or less local, or confined to particular districts, others occur anywhere with the type, but they are all tolerably common, and distinct enough to have been thought different species.

There are other species much subject to variation in which no distinct form has as yet been produced. The common Tiger, *Arctia caja*, and the Gooseberry Moth, *Abraxas grossulariata* are special favourites with variety breeders in this country, and are excessively variable. Every change that can be rung on black, brown, red, yellow, and white has been produced in *A. caja*. Some are all black or brown, some all white; yellow displaces red in the hind wing; red displaces white in the fore wings. In *Grossulariata* the colours are fewer; black, white, and yellow only appearing. Yet the different appearances it assumes are marvellous. The narrow band of yellow that runs across the wing, spreads over the entire surface, and deepens to orange. The black spots disappear, leaving the specimen perfectly immaculate, they become semi-transparent, they form bands or streaks, or they spread over the entire wing. Yet in neither of these species has any permanent variety been produced, unless the nearly black form of *Grossulariata* known as *Varleyata*, Porritt, be considered such.

When a form occurs, presenting a marked departure from the type, it must in a state of nature, almost certainly pair, if it pair at all, with an ordinary specimen. The progeny of such a pair may reasonably be expected to partake of the characters of both parents, some differing not so much from the type as the one, nor yet so closely resembling it as does the other. These, pairing again with the ordinary form, should produce offspring that at this second generation are still less divergent than the first, and after a longer or

shorter time, depending upon the extent of the variation, the difference would be quite lost. This absorption of a divergent form, is one of the causes of species remaining permanent. It is only when such divergence is of a character likely to be of service to the species, that it has any chance of being preserved. I am not, however, concerned now with the causes producing alteration of form, but rather with its preservation when produced. Insects like *A. caja* and *A. grossulariata*, that vary very much in this country, do not necessarily do so abroad, and though there is not at present any appearance of a permanent variety being established of either species, it is quite possible that the causes, whatever they may be, that are producing these extraordinary aberrations, will continue to operate until this result is brought about.

There appears to be some inherent force always operating to perpetuate the existing form, as well as to produce change or variation, and when once a variety has been established it is easier to retain it than to produce another. Different as are the sexes of many of our butterflies and moths they continue unchanged. Many exotic species differ very much more than ours do, but the same thing obtains with them. Even when two or more forms of the female are found they preserve their special characteristics generation after generation. As in the case of *Papilio turnus* and *glaucus*, one batch of eggs will produce males and females differing from each other, or males and two or more forms of the female. We never find species combining the characters of the two. *Pieris brassicae*, for instance, in which the sexes differ only in markings, never appears with a male showing the markings peculiar to the female, even in a lesser degree. *Argynnis paphia*, in which the sexes differ in colour as well as markings, never produces a male with the colour or marking of the female, though like *Papilio turnus*, it may be quite possible for both sexes and the dimorphic form *Valezina* to come from one batch of eggs. A male *Valezina* is said to be in Mr. Bond's rich collection, but a single specimen can only be deemed an accidental aberration, and even if such specimens were frequent they would in no wise be intermediate between one and the other. Mr. Bond's has the markings of the male, but is nearly as dark as the variety. Hermaphrodite specimens have occasionally been taken of *Edusa*, *Semele*, and some of the blues. Even these never have the sexual differences in markings mixed. One side will be male and the other female. The variety of *Angerona prunaria* with dark border is by no means rare, and as I have said, occurs in both sexes. Sometimes the dark border is considerably extended, and nearly covers the wing, a small portion of the centre only, retaining any orange scales. I never saw a specimen in which the border was narrow, broken, or suffused with orange. Any such form might be considered intermediate, but they either do not exist, or are very rare. Black *A.*

betularia (*Doubledayaria*) are by no means rare, and are easily reared. But though I have bred a goodly number of it, all that ever I obtained were either one form or the other, either true *Betularia*, or true *Doubledayaria*. Intermediate forms of this species do, however, exist, but they are so rare that I never took but one, and never saw but two. I noticed a singular thing when breeding this species. From ova, deposited by a black female I reared a considerable number of imagines, of which about one-half were black, and the other of the type. I then tried to pair two black ones, but they took no notice of each other, though both paired readily with a grey specimen of the opposite sex. Mr. Malings of Newcastle, who supplied me with the ova, told me his experience in this particular was the same as mine. This certainly does not obtain with all species, but I once bred a buff-coloured female *grossulariata* that would not pair with any male I could obtain.

Rurea var. *combusta* is similar in character to the last. The darker marking of the type have spread over the whole of the superior wings. The type varies very slightly in the extent of the dark markings, but I never saw one approaching *Combusta*. The banded forms of *Boarmia repandata*, and *Acidalia aversata*, are also varieties similar in character to each other. The dark scales in each being gathered together in a band across the wing. Neither is rare, but I never saw an intermediate form of either. I might multiply such illustrations *ad nauseum* without going beyond our British fauna, but it is unnecessary. I have given enough to show that where two or more well marked forms of a species exist, whether sexual or not, that both or all, continue to be produced without examples intermediate between them, or if intermediates occur, they are so rare that they can only be considered aberrations. In species that do not produce well marked forms this peculiarity does not obtain, It would almost appear that those which vary excessively are unable to produce a distinct variety.

Now this permanence of both type and variety, where both occur together, is very curious. Still more strange is the permanence of the various sexual forms. If a negro married a white woman their children would be mulatto, intermediate between the two. This, however, does not obtain with *A. mendica*. The sooty hued male and white female do not produce a mulatto-like offspring, but all the males are dark like the father, and all the females pale like the mother. If this negro's brother were wedded to a yellow-skinned Asiatic, how amazed we would be to see their boys black, and their girls yellow, and how earnestly we would declare it to be impossible, should these mothers have daughters, some of whom resembled themselves, and some their sister-in-law. Yet this is exactly what occurs with dimorphic species, like *Papilio turnus*, and others that have been named above.

NOTE.—For several of the illustrations and facts in this paper I am indebted to an essay on the Malayan Papilionidæ, by Mr. Wallace, in the "Transactions of the Linnæan Society," Vol. XXV.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

THE President (Mr. Hockett) took the chair at the meeting held on July 23rd, and exhibited a very striking variety of *Abraxas grossulariata*, which he captured at Hale End, together with other species from the same locality. Mr. May brought up a long and beautiful series of *E. cribella*, and Mr. Jobson shewed no less than six species of "clearings," viz.:—*apiformis*, *bembeciformis*, *culiciformis*, *myopæformis*, *formicæformis* and *tipuliformis*. Several other species were on the table, amongst them being four species of the genus *Anthophagus*, shewn by Mr. Lewcock, who had received them from Bath, and Mr. Anderson distributed, on behalf of Mr. Robson, specimens of *Agrotis tritici* and *Luperina testacea*. At the following meeting Mr. Harper exhibited a bred specimen of *E. autumnaria*, and Mr. Clark introduced a discussion on *M. athalia*, giving interesting details of its habits as observed by him in Abbots Wood, and he exhibited a magnificent variety captured there this season. Several members spoke of the disappearance of this insect from all the localities near London, where it was taken years ago, Chatten Dene being especially mentioned.

On the 6th August there was an unusually good attendance, and many exhibits. Mr. J. A. Cooper, who presided, shewed a fine series each of *E. orbicularia* and *E. rectangulata* and twenty-one beautiful specimens of *E. venustula*, captured this season in Epping Forest. Mr. Jobson also exhibited this species, and *P. betuella* and *cratagella*, whilst among the other good things must be mentioned Mr. J. A. Clark with *A. myricæ*, and a very dark form of the common *A. megacephala*, Mr. Franklin with *S. dubitata*, and *E. sambucalis*, and Mr. Russell's life-history of *V. c-album*. The chief object of interest, however, was a beautiful variety of *A. caja*, having the anterior wings chocolate colour, with only a thin white streak on each, while the blue spots on the posterior wings were confluent, and suffused, forming a broad blue band. The specimen was brought up by Mr. Gurney, who bred it, and has obtained ova from it.

In connection with his exhibit of *V. c-album* Mr. Russell gave details of its life-history, and observations made on it, together with remarks on the allied continental species. Mention was also made of its disappearance from Kent, and the failure of all endeavours to re-introduce it.

The meeting of August 13th was chiefly devoted to business, there were,

however, some interesting exhibits, prominent among which were a long and variable series of *E. viminalis*, *T. subtusa*, *N. despecta*, *E. crocealis*, *A. tritici*, *A. velligera* and *X. zoegana*, some of the latter being a very peculiar dark form. All these were shewn by Mr. Sheldon, while Mr. Clark had in his box four very beautiful forms of *D. carpophaga*, and amongst the coleoptera Mr. Lewcock had a fine series of *Telmatophilus typhæ*.

At the meeting of August 20th Mr. Harper recorded having seen no less than fifteen species of butterflies on the 16th in the Lea Valley, amongst them being a specimen of the rare *A. lathonia* and *C. edusa* and var. *helice*.

Mr. Gurney mentioned that two specimens of *C. edusa* had been taken in Epping Forest, and Mr. Clark had also seen the var. *helice* from the same locality, while Mr. Russell recorded it having been taken at Box Hill.—
ERNEST ANDERSON, Secretary.

OUR LONDON LETTER.

Though affairs here are apparently quiet, a large amount of work is being done. Most Entomologists have been or are at present taking their annual holiday, and we shall not hear of their captures until next month, when the number of exchanges, notes and records, will indicate the amount of success met with. As far as I can learn the past month has been a very good one for collectors, many good species having been fairly abundant, amongst which I may perhaps mention *E. fuscula* and *E. venustula*, both of which have been taken in good numbers, while on the Lea marshes the larvæ of *S. ocellatus*, *C. elenor*, *C. vinula*, and *H. chlorana*, were all abundant in the early part of the month. In town, the merry little males of *O. antiqua* have been fully as abundant as usual, also the autumnal larvæ are beginning to in an appearance, and should be abundant this year if the dry weather continue a little while longer. There is, however, considerable excitement respecting the appearance of *Colias edusa*, which has been taken in several spots near London, so that it seems by no means improbable that it may turn up in abundance this autumn. The ordinary species such as *Io*, *Atalanta*, *Cardui*, *Urticæ*, *Rhamni*, *Phleas*, &c., are all unusually abundant.

London, 20th Aug., 1885.

NOTES AND OBSERVATIONS.

NOTE.—“Coming events cast their shadows before them.” When at the Isle of Man last June, I went to the Scarlet Rocks, to collect larvæ of *Scio-phila Colquhounana* and *Eudorea lineolalis*, and whilst pulling a tuft of

Staticis armeria asunder, to get the gallery of *Colquohounana* out I found a short stout pupa, from which I have obtained an imperfectly developed moth quite unknown to me, either as British or Continental. As I am too old to work out this species I note it that some of our young friends may have that pleasure. Its larvæ should be looked for in March or April, or the perfect insect in July. Scarlet is a parish or place beyond Castletown, and Scarlet rocks are the wild igneous rocks beyond the marble or block limestone formation, and from the head of Castletown Bay, about two miles from the town on the coastway to Port St. Mary, near the limestone quarries.—C. S. GREGSON.

NOTES AT LUNDY ISLAND.—Notes from strange places are often of interest although the objects themselves be of ordinary occurrence. A few hour stay one day last July, on the rocky cliffs of Lundy, a rugged mass of granite and shale, washed by the waters of the Atlantic, revealed the following insects:—*urticæ*, *cardui*, *alexis*, and *filipendulæ*, in abundance, the latter were flying about and settling on the long grass in the sunshine. A closer search on the heather stems brought to light some empty cocoons of *S. carpini*, evidently a common insect on the Island. Hovering over a patch of red valerian was a Humming Bird Hawk-moth (*M. stellatarum*), and on a fence of granite boulders, near the lighthouse, a Dagger (*A. psi*), and a Shark (*C. umbratica*) added to the contents of the collecting box. The only other lepidoptera seen were *H. sylvanus*, *plusia*, *gamma*, some Meadow Browns, Heaths (*pamphilus*), and a quantity of Crambidæ. Circling round the cliffs on the western shore, were a pair of ravens; while sea birds innumerable, guillemots, puffins, gannets, razorbills, and others of the gull tribe, added to the scene, and gave some signs of life to the otherwise inhospitable shores of Lundy.—J. HENDERSON, Herne Hill, London.

SPHINX CONVULVULI AT HARTLEPOOL.—A specimen of this insect has just been brought to me by a labouring man, who took it some miles away. It is rather rubbed by being carried so far in his hands, but was still alive when it reached me. Its abdomen is perfectly empty.—JOHN E. ROBSON, 21st August, 1885.

TO CORRESPONDENTS.

T.R.B.—Only half your query was answered last month. The larva you enquire for is yellowish white, with a brown head and brown plate on second segment. It feeds on various roots, and lives underground more than one year.

PREPARATION OF LARGE-BODIED INSECTS.—T. R. writes that there is a method of preparing insects with beautifully marked bodies, under the air pump, so as to preserve their brilliant colours. Can any reader supply particulars.

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COLEOPTERA HUNTING ON SNOWDON.

By DR. JOHN W. ELLIS.

IN the September number of the "Young Naturalist," Mr. Wilding, in relating our adventures at Llangollen, refers to the fact of our being able to see from the summit of Moel-y-Gamelin, the distant peak which we hoped to visit at no long period of time and explore for beetles. He does not, however, tell us how provokingly near we were to Snowdon two days after our Llangollen excursion, when we spent a day at Bettws-y-Coed, and walked from thence to Capel Curig. Our first peep at the mountain home of so many good beetles, was obtained just after passing the "Swallow Falls Inn," where it appears over the N.E. or Capel Curig slope of Moel Seabod. Proceeding on our way the distant mountain disappears as the spur of the nearer one becomes more elevated, but after passing through the village of Capel Curig, and climbing some rough boggy ground at the side of the two lakes known as the "Mirrors of Snowdon," we obtained a splendid view of the tricephalous peak, which though only some seven or eight miles distant, was still to remain to us *terra incognita*, at any rate for the present. On this occasion our success in collecting both beetles and lepidoptera was about *nil*—the only species of the latter seen being the ubiquitous *Diurnea fagella*, which was abundant on the trees overhanging the Llugwy about the the "miner's bridge."

At Whitsuntide, I spent two days (Saturday and Sunday) along with Professors Herdman, of Liverpool University College, and Milnes Marshall, of Owen's College, Manchester, and a number of kindred spirits, in a dredging expedition which had for its object the investigation of the marine fauna of the North Wales coast. Saturday evening, after calling at Llandudno for two of our party, we spent in a most unpleasant manner dredging and rolling (especially the latter) off the Great Orme, but the weather turned out so rough and wet, that instead of making for Beaumaris where we had intended to spend the night, we put back into Llandudno Bay, and most of us were

thankful to get ashore, where we enjoyed a capital dinner (at 9.30 p.m.), provided for us at the "St. George's Hotel." Next morning the weather looked so promising, the rain of the previous night having given place to bright sunshine, that all of our party, with two exceptions, rejoined the "Hyæna," although we had most of us bidden our leader good-bye on the previous night, the rolling propensities of our steamer having taken the science out of most of us, and replaced it by a determination to return home by the first train on the morrow. Those who did return to brave the great rollers which we encountered outside the bay had reason to be thankful for having done so, for having got under the lee of Anglesea by 11 o'clock, we were in fairly calm water, where our dredging and trawling went on most successfully, being carried round Puffin Island and on through the Menai Straits, steaming as far as Port Dinorwic, when finding the tide did not favour our getting back next morning (for we had intended staying at Carnarvon for the night), we put about and returned to Beaumaris where we spent the evening, after tea, in pleasantly strolling through Anglesea lanes.

One of our party, Mr. Alfred O. Walker, of Chester, not wishing to return with the expedition to Liverpool on the morrow, I suggested his joining me in a day's excursion to Snowdon, to which he immediately consented. The following morning (Whit Monday, May 25th), we left the "Hyæna" and our friends at Beaumaris, and started by the early coach for Menai Bridge. Early coach though it was we found the only accomodation to be on the roof, where with our backs to the luggage we had a most uncomfortable seat but a splendid view of the Straits as we drove along, arriving at Menai Bridge just in time for a train which eventually landed us at Llanberis about eleven. Arrived there we had to run the gauntlet of "guides," one of whom, aged about seven years, gravely assured us that "we wass sure to lost ourselves," if we did not engage his services, for which he asked the modest sum of four shillings. However we did not believe in being "guided" along a path as as distinct as any causeway (and as rough as any pebbly beach), so determined to chance becoming the victims of another Snowdonian accident. After what I had heard and read of the toilsome climbing necessary to reach the summit even from Llanberis, which though the longest, is by far the easiest of the various paths, I was thoroughly—I was about to say disgusted—at the fact that I had had far harder climbing in the neighbourhood of Llangollen, and at much lower elevation. Indeed by taking it easy—the true secret of mountain climbing—I was never once out of breath in the whole of the ascent, five and a half miles from Llanberis. When we reached an elevation of 1800 to 2000 feet beetles became common; and from this elevation to the summit (3570 feet) they were abundant, even among the thick patches

of snow which yet remained over most of the path unmelted by the sun. Among these beetles *Nebria Gyllenhalii*, so often looked for in vain in similar spots at Llangollen, was in swarms. I could have taken hundreds: very frequently on raising a stone of a couple pounds weight three or four would scuttle off, and being newly emerged they had a distinct blue tinge, so much so that on two or three occasions I believed I had captured the scarce *Leistus montanus*. *Patrobis assimilis* was tolerably common, and a common low-land beetle *Cryptohypnus riparius* was abundant at all elevations. I found a single specimen of *Carabus arvensis* of the dark green—nearly black—form, which Dawson records as occurring on Snowdon, but, unfortunately, it had lost both antennæ and nearly all its tarsi—a veritable cripple. I also took a single specimen of *Pterostichus æthiops*, but so far from mistaking this species for *P. madidus*, of which it is sometimes described as a variety, I did not at the time I captured it recognise it for either, and was puzzled with it until it had been mounted. Besides a few *Hemalotæ* not yet determined, the other beetles captured were common ones, such as *Pterostichus strenuus* and *P. vernalis*, *P. madidus*, *Agabus guttatus*, *Tachinus rufipes*, *Lathrobium boreale*, *Othius melanocephalus*, *Philonthus nigritulus*, *Liosoma ovatum*, &c. Long before we reached the summit we entered a mist, and from that time until we re-emerged from it saw very little in the way of view—from the summit itself we saw literally nothing but mist. After some refreshment at the huts, we commenced the descent—really far more trying than the ascent—and reached Llanberis just in time for a light tea before taking the train home at 5.30.

Far from being satisfied with my day's ramble at Snowdon, I felt as I was leaving Llanberis that it must not be long before I paid another visit, if possible a longer one, to such a charming place, and my captures, especially the *Nebria Gyllenhalii*, acted in a like stimulating manner on Mr. Wilding. We settled at once that on the very next occasion of a holiday, Snowdon was to be our destination. This opportunity for a holiday did not occur until August last, when we arranged to go to Llanberis on the Saturday preceding the Bank-holiday (how thankful hard-worked town's people ought to be to Sir John Lubbock for their Bank-holidays!) and to spend Sunday and Monday on Snowdon.

On Saturday, August 1st, we started from Liverpool fully equipped for entomological sport, by the "special express to Llandudno," timed to reach the latter place shortly after four. We might just as easily—more easily in fact, have taken the later ordinary train, for our "special" proved to be not a special express but a specially slow train, and owing to a series of mishaps, principal of which was the carriage behind the one in which we were taking

fire, and the train having to be stopped every few miles for water to be poured over the heated bearings and smoking timbers, we did not reach Llanberis until after 9 instead of about 6.30. We had originally intended to sugar on this, the first night of our holiday, but from some reason, what I have now forgotten, we had changed our minds, and we were now thankful for having done so. We had previously engaged beds at the "Padarn Villa Hotel," and here we had a capital tea, for which we were quite ready. Let me say that we found this hotel, which is close to the station, very well ordered and everything first-class at very reasonable terms. After a stroll round the village of Dolbadarn, for the true Llanberis lies two miles away, we retired for the night to sleep, perchance to dream of the good things (including swarms of *Chrysomela cerealis*) we were to take on the morrow. For myself the morrow came full soon, for I was awakened shortly after daybreak by the wind howling and moaning round the house, and converting my partly opened window into a veritable æolian harp, but I was rewarded for this intrusion upon my rest by the glorious view of the early sunrise which I had from my bedroom window, which overlooked the ancient Dolbadarn Castle, beyond which the whole of the celebrated Pass of Llanberis shimmered in the morning sun, the horizon being formed by Moel Seabod. I wished I was an artist that I might put the scene before me on canvas, but I had to be content with a pencil sketch, after which I went back to bed and slept till seven o'clock. After breakfast we started off in high spirits, our destination being, of course, the main peak (Ywiddfa or "the conspicuous") by the ordinary Llanberis route. Even at this early hour, and on a Sunday morning too in *Wales*, we were accosted by "guides," who desired to prevent us finding our way, but discarding all these we pushed on anxious to see what the first capture was to be. As soon as we left the plantation behind us and reached the open, we left the track for some marshy ground, where we disturbed a few specimens of *Cenonympha pamphilus* of large size, indeed so large that Mr. Wilding had some difficulty in convincing me they were not *C. Davus*. We soon found, however, better game in the person of *Aphodius lapponum*, which we found, sparingly at first but abundantly afterwards as we reached a higher elevation, in the sheep dung so plentifully bestrewing the slopes. Along with it were plenty of *Aphodius ater*, of both the red and black forms, and the commoner *Cercyous*, as also a *Tricopteryx* not yet determined. We hunted in every likely spot for our great desideratum, *Chrysomela cerealis*, but without any but a negative result. As we gradually ascended we took one or two specimens of *Pterostichus æthiops*, but did not meet with this in anything like the numbers we were led to expect. *Patrobis assimilis* also occurred and *Nebria brevicollis*, but not in any great numbers, and not at all

until we reached the 2,000 feet elevation, *i.e.* the level of the frowning cliffs of the Clogwyn dur Arddn, which faces one all along the path until the half-way house is reached, when the steepest part of the ascent commences, the track eventually rising above the precipice. On this occasion, as on my former visit, the top of the precipice was hung over, and in parts shut out from view by a dense mist through which we followed the path, collecting as we went, reaching the summit about 2 p.m., where, thanks to the fact of our being "travellers," we were able to obtain some well earned as also much desired refreshment. Nothing whatever was to be seen from the summit, and we were glad to get down again into regions that repaid our trouble better, for above the 2,500 feet level everything, notwithstanding the mist, seemed so dry, even the moss which coats the rocks by the path, that scarcely a trace of beetle life was to be found. On our way back we searched every nook for *Chrysomela cerealis*—had almost made up our minds to descend into Cwm Glas, where relics of an Alpine flora (and therefore fauna thought we) are said to exist, but as day was fast departing we gave up the idea until another time. (Let me here advise the visitor to Snowdon to scramble away from the beaten path, provided the weather be not unpropitious, to have a look into this splendid Cwm, bounded on the far or southerly side by the singularly jagged Crib-y-ddysgyl and the sharp peak of Crib-goch.) At last a—shall I say it?—a shout of exultation from Mr. Wilding announced the capture our *desideratum*; there it was sure enough, and in another moment another one, within a few inches of each other. I shall never forget the pleasure with which we gazed on these beautiful insects—most beautiful of a beautiful family. But we must set to work now in earnest and get more. Of no avail, however, was our toil until it was nearly dark, we made up our minds that they were the only two specimens on the mountain. We came to the conclusion that the beetle could not be very common here, although we were somewhat late for it, for while in the webs of the fat spiders, so abundant under stones, we found remains of many species of beetle, not a single elytron or leg did we observe—and we looked purposely—which might have belonged to *Chrysomela cerealis*. Let me here say that Mr. Wilding has most generously given me one of the only two specimens we found during our excursion. While looking for *cerealis* we came upon many beetles: *Pterostichus æthiops*, about a dozen in all; *P. vitreus*, one; *Patrobis assimilis*, not common; *Carabus arvensis*, one, of the ordinary form; *C. catenulatus*, about half-a-dozen; a *Bradycellus*, which I hope will prove *collaris*; *Notiophilus aquaticus* and *biguttatus*, both dull black, and the latter with a very distinct pale lunate patch behind; *Olisthopus rotundatus*; *O. melanocephalus*; *Lesteva punctata*; *Bembidium tibiale*, at the waterfall;

Calathus micropterus, two, both immature; and *Malthodes flavoguttatus*, a single specimen under a stone at a elevation of 2,000 feet. Hurrying down the remainder of the path at a very much quicker rate than when we crossed the same ground in the morning, we arrived at our hotel about 9 p.m. and quite ready for dinner-tea, followed by a stroll as far as Llyn Padarn and Dolbadarn Castle; our arrangements for the morrow being to walk along the Pass of Llanberis and to again ascend Snowdon by the most difficult of the ordinary ascents, viz. that from Pen-y-pass (the old Capel Curig path).

Next morning found us down to breakfast at 7.30, but somehow, we could not exactly say why, we did not feel in such high spirits as on the previous day, and a shower of rain would most probably have deterred us from venturing on the trying work we had decided upon. After breakfast, too, when we had fairly started I am afraid we were not quite such good company as we might have been, although nothing was said by either of us as to the state of our feelings, but mine were decidedly a state of stiffness about the hips. However, after a pleasant walk down the famed "Pass," but which we did not enjoy perhaps as much as we might have done had we been able to see beyond the thick veil of mist which shut out the mountain tops from view, we arrived at the celebrated Pen-y-pass Inn or "Gwphwysfa" (the resting place), where we had a very light refreshment and a quarter of an hour's rest before commencing the four miles of ascent which lay between us and the summit. Just as we were leaving here a Liverpool acquaintance and his friend met us, having just descended by the path we were about to take, they having spent the night on the summit in the hope of seeing sunrise—a hope usually vain as it was in their case. They strongly tried to dissuade us from attempting the path which they said was in a very unsatisfactory condition, and, they said, had they been able to see where they were going they would never have attempted it. What were we to do? Just now, too, rain began to fall, and we had no umbrellas, no overcoats. What *were* we to do? Should we go back the way we had come or should we push on and chance a drenching? "Faint heart never won fair lady," and "Fortune favours ——" well, never mind, only we did not believe that we came under this category. Let us push on by all means! and push on we did after taking leave of (but no advice from) our friends. We had a good—a very easy walk for nearly two miles before the actual ascent commenced, following the north bank of Llyn Llydaw, and then by a rough and very steep scramble to the old copper works near the outlet of Llyn Glas. On the previous day when looking into the hollow where we now were the two lakes, Glas and Llydaw gave us the idea of there being very little difference of level between them, but now we were perfectly surprised to find that the stream from the

one fell perhaps 800 feet in a pretty cataract before reaching the other. As we began to ascend we found our spirits becoming more and more buoyant—our lassitude, which, of course, was at the bottom of our previous *malaise*, wore off—we felt fit for anything almost, perhaps, to ascend the stupendous Clogwyn-y-Garnedd, which, however, we could not see for mist. After a few minutes rest at the old copper works—now disused—we recommenced the ascent, and now came the tug of war. By some means we had followed the lower of the two paths, although we had kept a look out for the upper one, which is much less steep and in better condition, but had failed to find it. In many places we had to climb on hands and knees, and now, to make matters more difficult a breeze sprang up, the sun broke out and within a very short space of time the mist had cleared off, and we saw opposite us and towering above us for 2,000 feet, nearly sheer drop, the face of the gigantic precipice, the Clogwyn-y-Garnedd, crowned at the top by the cairn and refreshment huts of the principal summit (Ywiddfa.) The sight above was grand but terrible. How were we ever to reach that far-off goal? We could see a number of persons clustered about the cairn, but they were mere dots. To go back would be foolish in the extreme, so I feel sure we both thought, but neither suggested such a course to the other. Nevertheless, by dint of steady (and heady) work, our legs being assisted by a trusty stick, we gradually found the summit coming nearer and nearer, and the drop into the gulf below, which a single false step might have caused, more to be guarded against, until at last by a series of zig-zags we landed on the Bwlch-Glas—the ridge which connects the central portion of the mountains to the spur of which Crib-goch is the termination—the ridge along which the Llanberis path passes, and which we had yesterday traversed. But what a difference to yesterday! Instead of mist, behold a glorious view of land, sea, and sky. Right before us, bursting suddenly into view as we emerged from the gulf, we saw, as on a map, the curious arm-like peninsula of Carnarvonshire, which terminates at “Hell’s Mouth”—Cardigan Bay—the Rival mountains, and nearer still Moel-Hebog; to our right lay the village of Dolbadarn, the lakes Padarn and Peris, while away beyond we had a bird’s-eye view of the whole of Anglesea, the South Stack lighthouse, Holyhead, the Menai Straits, the tubular bridge—even the towers of the latter being quite distinct. We hurried to the summit to get a view of the southern prospect, but, before we could get over the half-mile which still intervened between us and the huts, the mist had come on and quickly shrouded even the summit itself from view. Waiting there for awhile in the hope that it might again clear we were rewarded by one of the finest views it is possible to conceive. In addition to the spots already enumerated, which were even rendered more distinct, we

had before us to S.W. the estuary of the Mawddoch—the South Wales coast to St. David's Head—numberless mountains to the south, with Cader Idris filling up the extreme distance. Eastward we had below us the enormous gulf of Glaslyn, from which we had just ascended, bounded northwards by Crib-goch and Crib-y-Ddysgyl, and to the south by the Liwedd ; while beyond lay the valley of Capel Curig, with the "mirrors" sparkling in the sunshine—the spot from whence we had obtained our first view of Snowdon. Behind the "mirrors" lay Moel Siabod, one of the most tempting mountains as far as appearance goes that I know ; while far beyond, over the vale of Beltws, was the Clwydian range, with Moels Faunnau, on which with my glass we could distinguish the remains of the Jubilee Tower ; while to the S.E. lay the Llangollen mountains, looking very little in comparison with the heights of the Glyders, and the Carnedd Llewellyn and Davidd close by on our left.

It was with difficulty we could tear ourselves away from the beauteous prospect before us, but our train left shortly after five, and railway trains, like time and tide wait for no man (except directors), so we most reluctantly had to hurry away at a smart rate down the Llanberis path. Here our first and only accident befel us. In scrambling down a bit of very rough "scree" (for a short cut) my boot caught against a stone and carried away the heel—torn completely from the sole and hanging to the rest of the boot by a half-inch breadth of upper leather. Here was a nice pickle—three miles from Llanberis, and no available heel to one's boot ! What was to be done ? Far from sympathising in my misfortune, my friend could not help laughing again and again at my sorry plight (I really believe it was the bracing mountain air—not want of feeling on his part), and I met with the same sort of consolation from several passers by, when I asked if they happened to have a spare pair of boots in their pockets. Never mind ! I never go out without a piece of stout cord in my pocket, so with the aid of my knife, I soon had a groove cut round the heel, and the whole of the portion adrift lashed securely to the rest of the structure—not an elegant, but a most convenient way of cobbling. Increasing our pace to make up for lost time, and our sides quite aching from the excessive laughing engendered for my misfortune—I was thankful it had not happened sooner on the Capel Curig ascent, or it might have proved no laughing matter—we at last reached Llanberis, far fresher than when we started, notwithstanding our exertions, just in time for a hurried tea, and the train home. On this day nothing whatever of interest occurred among the beetles, although we frequently halted on our upward path to seek for them. On the Capel Curig side there was plenty of wet moss, but *Notiophili* and *Cryptohypnus riparius* were the only species met with. We arrived in Liverpool somewhere about 11 p.m., feeling some-

what tired, but certainly very well satisfied with our holiday trip to the "storm-riven head of old Snowdon."

Liverpool, September, 1885.

THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A.

OCTOBER.

NOW the leaves are falling fast,
 Gladsome Summer's days are past.
 Yet when comes the evening gloom
Lotas flock to ivy bloom,
 "Chestnuts," ruddy winged are there,
Lituras too the banquet share.

The warm bright days of Summer are now giving place to the fogs and rains of Autumn, and most of the gaily-tinted butterflies which gladdened the entomologist's eyes, as he took a country ramble a month or two ago, are fast disappearing, either killed off by the wet weather and decreased temperature, or hiding themselves in snug out-of-the-way places, until the cold of late autumn and winter shall have given place to the genial mildness of spring. Yet it is the great merit of the English climate in the eyes of an entomologist that bright sunny days occur at all seasons of the year, and there is no time when he need be idle. In October we are pretty sure to have several such days, especially in the early part of the month, and it is on such an one that I propose to take my readers on an imaginary entomological ramble, by way of illustrating what the insect world is like in October.

When we get out into the country we see the woods as rich in colour as the sky on a summer's sunset, and like the resplendent hues surrounding the declining sun, they seem to be promising a return of the time when the trees will again be in all their verdant glory. Just as the sunset's tints seem to say to us

'Though the daylight fades away
 There will come another day,
 There will be another dawn,
 When before the rising sun
 Darksome night will have begone;
 Surely as the gloom comes on
 There will be to-morrow morn.

So the trees seem to say to us gleefully with their cheerful tints—

'Though our leaves are turning sere,
 'Though our branches dead and bare
 Soon aloft we'll fling,

And our life seemed passed away ;
 Yet there'll come another day,
 When the sun's returning ray
 Comes with genial Spring.
 That assuredly will be seen
 Trees again in living green.

We will cross this meadow to yonder oak tree in hopes of beating *Chimabacche phryganella* out of the boughs, or finding the larva of *Carpocapsa splendana* in the acorns. See! we have started a greenish moth, which upon securing, we find to be *Cidaria miata*, known also as the Autumn Green-carpet. There is also another of the genus out now—the Red Green Carpet. (*Cidaria psittacata*), which occurs in several localities in the north.

But now we will go over to yonder osier-beds, by the side of which we see several willow trees; possibly we may obtain a full-grown Goat-moth caterpillar (*Cossus ligniperda*), for they come out of their burrows about this time in order to pupate.

See! a little moth flies out of the osiers. Now it has settled on the trunk of a willow-tree and we see that it is a glossy-winged reddish-brown coloured tortrix, with arched costal margin to the fore-wings, which latter are at least thrice as long as they are broad. We at once identify it as *Pædisca piceana*, specimens of which have been out since the end of June. Some moths have an orange-coloured streak along the middle of the wing, other individuals of this species have the inner margin whitish.

There are several other tortrices out now: for instance the silvery-grey *Chemiatophila mixtana*, with reddish costal margin, is common in heathy places; the pale-green *Oxygrapha literana* is still out; the whitish-grey, mottled *O. scotana*, may be looked for by northern entomologists, among the birch trees of Perthshire; and the grey, slightly freckled *O. scabrana*, having two dull reddish clouds in the costal margin, may be found among elm trees.

Most of the genus *Peronea* too occur in October. These moths all have forewings longer than double their width. The very variable *Peronea tristana* is not scarce in localities where the mealy guelder rose (*Viburnum lantana*) grows plentifully. Some specimens are whitish, inclined to ochreous; others are greyish; some are reddish grey, and others are whitish grey. There is generally a large reddish brown triangular patch on the costal margin, extending almost as far as the apex of the wing: in some specimens this patch is less reddish than others, and sometimes it is brown without any red shade at all. There is also a small triangular spot on the inner margin of each forewing. The pale-grey *Peronea favillaceana* may still be found plentifully in beech woods, the rare *P. maccana* should be looked out for in the north, the exceedingly variable *P. hastiana* is very common among sal-

lows, and the pale brown *P. umbrana* may be taken in the New Forest and other southern localities, as may also the very variable *P. cristana*.

Were we in a locality where birch grows grows plentifully, we should be pretty sure to see the common *Paramesia ferrugana*. It has forewings more than twice as long as they are wide, with the tips slightly produced, the costal margin of each wing is arched abruptly at the basal end, and is very slightly concave in the middle portion. In colour they are pale reddish ochreous, with darker reticulations and freckles, and there are several small tufts of raised scales on the surface.

There is another tortrix too we may perhaps find a stray specimen of among the osiers, although it is rather late for it. This is the grey *Teras caudana*, some specimens are ochreous, in fact it varies very much, and may be found in all shades of grey and ochreous.

Suppose we search on these willows for the larva of *Scotosia undulata*. It is grey, with a broad whitish spiracular line, and there are two thin lines on the back, of a dirty-white colour. We may, possibly be unable to find one, as, although it occurs in several places, it is far from common. But, see! we have found a sixteen-legged caterpillar, with protuberances on its back—or rather on the back of the sixth, seventh, and eighth segments. In colour it is grey, with three pale stripes on the sides. It is the larva of the Pebble Prominent moth (*Notodonta ziczac*). We also find it on poplar. And here is another one with no protuberances on its body, which we may congratulate ourselves on finding for it is a decidedly less common species than the generally distributed Pebble Prominent. It is pale green in colour, and has four interrupted white lines on the back and a yellow one along the spiracles. We recognise it as the caterpillar of *Pterostoma palpina*. Like *ziczac*, it feeds on poplar as well as willow. There is another of the Prominent moth caterpillars to be found at this time of the year. It is the larva of the Coxcomb Prominent (*Lophopteryx camelina*), and is green in colour, with small red spots in a line with the spiracles, and there are two little red-tipped projections on the last segment. We find it in most places feeding on birch and hazel, as well as other trees.

Here is a grey, thick-bodied moth, at rest on this post. It has a blackish streak from the base of each forewing along the middle, and several other irregular blackish streaks beyond this. It is evidently the Sprawler moth (*Petasia cassinea*), and although not a very rare one cannot be considered common.

We may as well search about the dead leaves, under these willows, for the pupa of *Hadena glauca*. It is dark-brown in colour, and has spines on the tip and on each segment. Although it is as well to look for it, I fear we

shall not find one, as is far from being a common moth, and is by no means generally distributed.

But the declining sun warns us that October brings us shortening days and that evening will be speedily coming on. We have no need however to hasten home yet; on the contrary, we will walk on to where we know the ivy is blooming profusely, for there we feel assured that by the aid of the lantern, which we have thoughtfully brought with us, we shall add many a moth to the captures we have already made. The twilight overtakes us as we walk along, and we see the dusk flying lepidoptera fluttering about the withering hedges, and we have plenty of employment for our nets. All the moths, however, seem at present to be one sort; pale ochreous coloured geometrina, with their forewings marbled with ochreous brown. They are in fact Mottled Umber Moths (*Hybernia defoliaria*), and are all males. The females are entirely wingless, and anyone ignorant of entomology would never imagine them to be moths at all. If we light our lantern we shall be pretty certain to find some of them on the hawthorn or sloe stems.

These Mottled Umber Moths vary very much. Some have two very distinct irregularly-shaped bands across each fore wing, others have these bands more or less obliterated; and again specimens occur with the wings uniformly reddish-brown. They are common moths in most places.

But while we have been searching with our lantern for the female *defoliaria*, we have found a brown looper caterpillar on a sloe bush, which alarmed by the sudden glare holds itself out stiff and straight, and tries to make believe it is a dead twig. And, indeed, it looks very much like one, especially as it has two little protuberances on the seventh and ninth segments which aid in the deception. But, however, it need not alarm itself, for it is only the caterpillar of the common *Rumia crataegata*, and we do not care for boxing it. We could find others if we cared by the light of our lantern, but we prefer to hurry on to the ivy-bloom.

And now we have reached the attractive blossoms, we find the moths there in plenty. The most abundant of them are the grey *Orthosia lota*, the reddish-brown *Anchocelis litura*, with dark-grey hind wings, the somewhat larger chestnut (*Cerastis vacinii*), the reddish-ochreous and brown Satellite (*Scopelosoma satellitia*),—easily recognisable by its conspicuously light coloured reniform stigma, showing as a white or orange-coloured crescent; the slender-bodied *Xanthia ferruginea* with pointed tip to its forewings, the thick dentated-winged *Miselia oxyacanthæ*, and the well-known Silver Y-moth (*Plusia gamma*), which we see bustling about everywhere, not only at dusk, but even in the bright sunshine, all through the summer and autumn.

And besides these we shall probably see the yellowish-ochreous *Orthosia*

macilenta, especially as there are beech trees not far away, and the greyish *Anchocelis pistacina*, and also the dark reddish-brown *Cerastis spadicea*, of the same size as *Cerastis vacinii*, and popularly known as the Dark Chesnut Moth; together with one or two others mentioned last month.

See! a large moth dashes up to the light of the lantern. You think it is a hawk moth by its size; but no, I am much mistaken if it be not one of the Sword-grass moths. Now we have secured it by a dexterous sweep of the net, and we see it is *Calocampa exoleta*; known to entomologists, who have a liking for English names, as the common Sword-grass Moth. There is another kind about now, known as the Red Sword-grass Moth (*Calocampa vetusta*). Neither of them are at all generally abundant, and this last is the scarcer of the two. Now another large moth flies up to our lantern, and upon securing it we find it to be the rosy-tinged Angle-shades (*Phlogophora meticulosa*); and here comes a smaller one, which is evidently one of the Thorn-moths, and we recognise it as the Feathered Thorn (*Himera pennaria*), which, although not scarce, does not occur everywhere in equal abundance. It has a stout body and downy thorax; the forewings are of a reddish ochreous colour, with two dark fuscous lines, and a spot near the apex of the wing.

But now it is time we wend our way homeward, which we accordingly do, well satisfied with our evening's work. There are some rarer moths, etc., we might have met with were we lucky enough. These will be found mentioned at pages 250 and 251 of the last volume of the *Young Naturalist*, and to repeat their names will take up too much space.

Cambridge.

ON SETTING LEPIDOPTERA UNPINNED.

By GEORGE COVERDALE.

Many enthusiastic young naturalists, and some old ones too, whilst energetically collecting the larger Lepidoptera, seem to ignore the very existence of anything smaller than an "*Eupithecia*." This is greatly to be deplored, for none but those who study the "Micros" can realise the endless pleasures and surprises in store for the thoughtful student of the Tortrices and Tineina. The chief cause of this neglect of the smaller species is undoubtedly the great difficulty experienced by many persons in pinning and setting their minute captures, and the uncertainty afterwards of their preservation. To lessen this difficulty and remove this uncertainty, much time has been spent in perfecting a system of setting, which enables anyone to prepare with comparative

ease the smallest "*Nepticula*," with the gratifying assurance that the work once done is done for ever.

The system advocated in the *Entomologist* (Vol. xviii. No. 266, p. 183) I shall now briefly proceed to describe. The process consists of two distinct stages, the insects first being SET and afterwards MOUNTED upon a support. We will first consider the

SETTING.

Suppose we have a "*Nepticula*" to deal with. After it is killed, throw it on to the setting board. With the setting-needles then turn it on to its ventral surface and hold the insect down (say with the left hand) with one needle, by gently pressing the body where the abdomen joins the thorax, that is to say at the base of the anterior wings on the inner margin. A breath will now blow out at least one pair of wings, probably the right hand pair, perhaps both, but this depends upon the position in which the setting needle is held. If only one pair is blown out change the setting needle to the right hand and repeat the operation, when all the wings will be expanded. At this stage the position of the legs and antennæ may advantageously receive attention, the first and third pairs of legs being the most important. The next thing is to place the insect, wings expanded, upon the groove of the setting-board, but before proceeding further it should be noted that the size of the groove, both as regards width and depth, is a most important matter. It should certainly not be wider than the thorax of the insect, even a tight fit being sometimes an advantage, and its depth just sufficient to allow the body to touch the bottom of the groove, with the wings resting flat upon the board. With a steady hand now raise the insect up by sliding the two setting needles one under each pair of wings, and lifting it into the groove. If the size of the groove has been properly chosen, a slight pressure with the needle will suffice to retain the insect in its proper position for setting, or perhaps a pin or a brace may be required for that purpose. The wings are now to be got into position for bracing, which is best accomplished by pushing them up not *horizontally*, but by working in a *curve vertically*. A little reflection will show that one might expect such a result, because this is the natural line followed by the up and down motion of the wings in flight, and they move much more freely in this direction than in any other. Indeed I have on many occasions set out a "*Nepticula*" on the board without placing it into the groove at all, or employing any means whatever to keep the body still. Such a delicate operation being utterly impossible without a due regard to this important matter, and I must urge upon all who wish to succeed the imperative necessity of careful thought and attention to these details of manipulation. Large insects will require some little modification in the pro-

cess, such as a couple of pins placed against the shoulders and sometimes cross ones to keep the abdomen down, but the principle is the same for all. Our "*Nepticula*" being now properly set, the next thing to consider is the

MOUNTING.

This, of course, is not commenced until the "*Nepticula*" is dry. Take a pin (say a No. 20), cut off the head, and with the forceps turn down at right angles a short piece of the pin, a little shorter than the body of the insect. The "*Nepticula*" should now be unbraced and placed on its back on the edge of the setting-board, so that its antennæ may project over and not get broken. Stick the bent pin into a little block of cork, which will serve for a handle, and then dip the bent portion into a solution of shellac in spirit, and apply the pin to the ventral surface of the thorax and abdomen, so that the small bent portion points to the head of the insect. If the shellac is sufficiently liquid the pin will instantly adhere, and with the forceps may be stuck into the setting board to dry. As this drying process goes on a little attention will be required to keep the insect in a horizontal position. This is easily accomplished by occasional touches with the setting needle. If the shellac is too liquid it will penetrate the body, and perhaps spread to the wings of the insect, which will then have the appearance of having become greasy; if not sufficiently liquid, the adhesion of the insect to the pin will be imperfect and insecure. A few trials will soon disclose the happy medium. If the shellac is in a watch glass or any very open vessel a drop or two of spirit must be occasionally added to make up the loss by evaporation. It is a good plan to use the shellac from a small test tube. With larger insects such as Tortrices, the head of the pin is first beaten out flat, and then turned down, thus giving a larger surface to support the body; with larger insects still, such as "*Pyrales*," the head of the pin, after being beaten out, is split up with a pair of scissors so as to form a fork, and then turned down as usual; with even larger things such as "*Sphingidæ*," the two ends of the forked part may be turned upwards with the forceps, so as to form a cradle, which admirably supports the bodies of the largest species. Of course, different sized pins are used to accommodate the different insects, but I think it would be well to adopt one uniform height at which they should be supported from the surface of the cork. This is evidently an easy matter, depending upon the length which is turned down and the thickness of the thorax.

The advantages of this new method are obvious. In the first place the process of setting is much facilitated, a large proportion of the difficulties encountered being due to the action of the pin in displacing or destroying the muscles of the Thorax. With no pin the wings instead of being thrown into awkward and obstinate positions are generally flaccid and in beautiful con-

dition for setting. Then again, there is no danger of verdigris, nor can the abdomen of the insect break away from the thorax as so frequently happens with pinned specimens. And furthermore, the insects are anatomically perfect with their proper number of legs *and* a thorax, which can hardly be said of a pinned "*Nepticula*."

In conclusion, let me urge upon young naturalists particularly the adoption of this new method, especially for their Micros. For an old entomologist with an extensive collection this is a great innovation and a sacrifice of uniformity hardly to be expected of those who want but a few species to complete their cabinets. But for the young entomologist just beginning the study of the Micros no such sacrifice is required, and a fair trial of the system will I am persuaded result in its ultimate adoption.

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SOME COLEPTEROUS LARVÆ.

By H. WALLIS KEW.

The lepidoptera may be reared from their larval state with comparatively little trouble; their larvæ being in many cases conspicuous and beautiful, and thus easily found. This is, however, by no means the case with regard to Coleopterous larvæ. The substances upon which many of these larvæ feed are of a perishable and often of a repulsive nature, and the larvæ themselves frequently remain concealed, and in but few cases can they be called either conspicuous or beautiful. Although the above may be taken as a general rule, like all other rules it has its exceptions. There are indeed some of the smaller coleopterous larvæ which may be reared with less trouble than the caterpillars of the Cabbage Butterfly. And these the young naturalist will find very interesting, even though, like the writer, he may not make coleoptera his special study. While out collecting botanical specimens, or otherwise endeavouring to make Natural History an excuse for recreation, I have carelessly boxed and taken home the larvæ of *Chilochorus renipustulatus*, *Cassida viridis*, and *Coccinella 7-punctata*; the perfect insects of which have in each case appeared in the box in which the larvæ were placed, in a very short time and without any trouble on my part.

One holiday afternoon (23rd August, 1884), while in a wood with a friend in search of "Crabs" (*Pyrus malus*), the fruit of which my friend considered a necessary ingredient in the manufacture of home-made "chutney," I came across the larvæ of *Chilochorus renipustulatus* for the first time. My friend had climbed into the branches of one of the pomiferous

trees, and was industriously filling a large bag with the required fruit, while I was listlessly exploring the wood around, which at this place happened to be planted with young ash trees. On the pale bark of these trees the *Chilochorus* abounded, both as larvæ, pupæ, and perfect insects. The larvæ resembled those of the "lady-birds" in general appearance, being of a dark slate colour, with six small tufts or projections on each segment of the body. The pupæ were attached to the bark of the trees by their tails, and had the old larval skins, which were split down the middle of the back, still upon their lower portions. The larvæ which I took home pupated 18 days later, and after remaining in that state a short time, emerged in the imago form. The imago is also "lady-bird" like in form, and is black with one red spot on each elytron. It appears to be a common beetle. This year a member of our "Louth Naturalists' Society" has found these larvæ plentifully on willow. In this case they pupated on the stems and leaves of the tree.

The larvæ of the Tortoise beetle (*Cassida viridis*) are known to almost every one. Their peculiar method of holding a pile of their excrement over their bodies is related in nearly every book on Natural History, which touches upon Coleoptera. On the 29th July last I took several of these flat bristly-sided larvæ from an arable field, where they were extremely numerous, feeding on the thistles. This larva measures about 3 lines by 2 lines and is greenish, except the head which is black. The mass of excrements which is held over the back is nearly as large as the larva itself. The larvæ taken pupated 13 days afterward. Before this change they remained motionless on the underside of the leaves of the thistle for a day or two, having dropped the mass of excrements previously. The pupa is brownish and very flat, still having spines on its sides, and retaining the forked apparatus at the end of the abdomen. The pupæ which I had, remained in this state from 11 to 14 days, the first perfect insect appearing on the 21st August.

I boxed a larvæ and some pupæ of the Seven-spot lady-bird (*Coccinella 7-punctata*) on the 27th July last, while returning home, through an arable field, after a country ramble. They were taken from the stems of barley. The appearance of this larvæ is, of course, well known. It is of a pale slate colour, with six small tufts on each segment (except the first—the head), except also the fourth and seventh segments, which have the two dorsal tufts, and an orange spot on each side, taking the place of the other tufts. The larva I took pupated two days later, and had emerged as an imago on my return from a visit to the east coast, on the 11th of August. The pupa is shining black, spotted on all its parts with orange.

A member of our "Louth Naturalists' Society" (Mr. R. W. Goulding) has reared numerous specimens of the somewhat local *Adimonia tanacetii*.

The black larvæ of this beetle were very plentiful in a moist meadow near here (Louth), where they fed on the leaves of *Scabiosa succisa* (Devil's-bit), eating large pieces out of them in the same manner as a lepidopterous larva would do. Considering the dilapidated appearance of the leaves of this plant which have been attacked, we might almost imagine that these doubtlessly innocent larvæ had within them a spite, not less Satanic than had the Devil, when he converted what tradition says was once a fusiform root into a truncate one. The year the larvæ were taken by Mr. Goulding in the field above mentioned on the 6th June, they pupated on the 21st June, and emerged in the perfect state 26 days later. The beetle is white when it first quits the pupal covering. Afterwards it is black, about $4\frac{1}{2}$ lines in length, its abdomen being large when compared with the size of the elytra.

Louth.

THREE HOURS ON THE SAND HILLS AT CROSBY, NEAR LIVERPOOL,

ON BANK HOLIDAY, AUG. 3RD, 1885.

Mr. Rose (of Barnsley) and his son being at my house on the above date, a proposition to have a few hours on the sand hills was carried *nem. con.*, and we spent three hours there, with the following results. On the willows, and poplar bushes *Liparis salicis* was sitting exposed, in plenty and in fine condition. *Agrotis tritici*, *A. cursoria*, *A. valigera*, *A. præcox*, *Triphæna orbona*, and *pronuba* including the var. *comus*, *inuba*, and almost every other variety named or unnamed were shaken or raked out of overhanging banks on sand hills. Passing along a rather high hill on which *Ononis arvensis* was abundant, it was remarked "this is the sort of place for *Heliothis marginata* larva a little later on in the month." This set our energetic friend Rose wild with joy, and it was not long before he brought two small green larvæ for inspection, *H. marginata* or *peltigera* certain, but too young to swear by. Being unwell myself I could not help my friends much, but upwards of three dozen larvæ were secured, including three or four of a *Noctua* larva too young to differentiate. When beating the banks sundry common species came tumbling or flying out, including several *Caradrina cubicularis*; and as Crosby sand hills are near where *C. exigua* was taken last year, all these had to be captured and examined, although time was flying. The pupa of *M. galiata* rolled down now and then, and sundry *Fusca*, *Crambus culmellus*, *Scopula ferrugalis*, and *Eudorea angustea*

where observed and taken when good. Several common *Tortrix* abounded, and *Peronea variegana* var. *asperana* was fine but rare, whilst a black form of it was plentiful, but the ordinary forms, generally so abundant, were not seen at all; and *Sciaphila hybridana* var. *curvifasciana* was plentiful, sheltered by its food-plant (an old thorn bush), from which it was driven out by fuscous smoke. We had no time for *Tinea*, but I could not resist a try for my old friend *Gelechia pernigrella* (*temerella*), and a puff of smoke made him show that he still lives in his old locality. Its now train time, and we reluctantly leave this glorious collecting ground, and are soon rushing along in one train to get on to another for Barnsley.—C. S. GREGSON.

OBITUARY.

The "Bradford Naturalists' Society" has recently lost, by death, one of its most useful members—Mr. John Firth—a working man naturalist, who died on the 29th August, 1885, at the age of 53. He was one of the promoters of the "Bradford Naturalists' Society," which originated in August, 1875, and was its first Vice-President. He was elected President for 1878, and has indeed held some office every year since the origin of the Society. In 1880, the Society defined a somewhat extensive area for investigation, and appointed Recorders for the various sections, Mr. Firth being the first elected Recorder of the Vertebrate Zoological section, an office which he held to the time of his death. He took a great interest in most departments of Natural History, but Ornithology and Entomology (Lepidoptera) were his chief pursuits, both of which he followed with considerable success. In 1875, the time when the "Bradford Naturalists' Society" came into existence, most of the district round here was purely "virgin ground," so far as the Lepidoptera was concerned, a circumstance which afforded Mr. Firth and his friends ample opportunities for doing some good original work; and amongst his most interesting captures may be mentioned *Larentia salicata*, *L. olivata*, *Geometra papilionaria*, *Emmelesia affinitata*, *Acronycta menyanthidis* and *Notodonta dictæa*, these and a large number of other species were added to our local lists by him. He always took great interest in handing in his records, was strictly accurate in all his work, and evinced great pride in helping beginners, both with information and specimens. Mr. Firth was also one of the promoters of the "Clayton West Naturalists' Society," and for some time a member of the "Heckmodwike Society"; and during the early existence of the "Yorkshire Naturalists' Union," then the "West Riding Consolidated Society," he took an active and practical part in its work. He

was interred at Scholemoor Cemetery on the 1st of September, and as a last tribute of respect his remains were followed to the grave by a number of his naturalist friends and admirers, who, on behalf of the "Bradford Naturalists' Society," placed on his coffin a beautiful wreath of flowers. The news of his death will be received with regret by a large number of friends in Yorkshire and elsewhere—and the writer of this brief notice, who has spent hundreds of happy days in his company in search of natural history specimens, has lost a constant and faithful friend and companion.—J.W.C.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting held on 27th August (Mr. Hockett in the chair) proved a very interesting one. Mr. Gates exhibited varieties of *A. caya*, bred from the varieties he had exhibited the previous year; there were several nice forms, and also several dwarf specimens the result of interbreeding. Mr. Edle brought a specimen of *S. convolvuli*, captured on London Fields, and presented it to the Society's collection. Mr. Russell shewed *C. silacea* and *B. pimpinellata* from Highgate; Mr. Hockett had a specimen of *T. amatoria*, bred that day from ovæ laid about five weeks previously, all the rest of the brood, about 100 in number, hibernating; and Mr. Clark brought up a very beautiful bred series of *A. imitaria*. The discussion was on *V. urticae*, but nothing new relating to this well known species was mentioned.

The following meeting was devoid of interest owing to the small attendance, Mr. May, however, distributed a number of pupæ of *G. flavago* amongst those members present.

The meeting of 10th, September, was also very poorly attended owing to the inclement weather, but the following week (September 17th,) there was a good muster and a fair show of captures. Amongst these may be mentioned *Saperda carchias* of which fine beetle Mr. Lewcock exhibited 4 beautiful specimens. Mr. Russell had a series of *H. popularis* which together with *A. lunosa* he recorded as common at Highgate. Mr. Clark shewed a bred series of *L. virescens*. Perhaps the most interesting box on the table was Mr. Thorntwaite's, containing some of the results of his work in North Devon; a very large number of species were represented, amongst them being *C. silacea*, *M. galia*, *C. populata*, *S. anomala*, *L. olivata*, *E. decolorata*, *A. promutata*, *C. umbratica*, *B. asinalis*, *B. terrealis*, and many Tortrices and Tinæ. Mr. McDonald shewed two specimens of *Heliothis*——?

imported in the larval state from Spain amongst some tomatoes. Two new members were proposed and the following donations made. Two specimens of *E. autumnaria* from Mr. Russell; one *B. asinalis* from Mr. Thornthwaite, and a pair of forceps from Mr. Clark. Several specimens of *S. convolvuli* were recorded and also a specimen of *C. celeriso* from Blackfriars Bridge.—
ERNEST ANDERSON, Secretary.

OUR LONDON LETTER.

The good prospects mentioned in my last have been considerable marred by the wet weather which has intervened, putting a stop to the anticipations of an "Indian Summer" and *Colias edusa*. Little has been done here lately, and the autumnal larvæ seem to have suffered very much, being few in number and very backward. With fine weather, however, we still hope for a little good beating in this district. As if to compensate for our disappointment regarding *C. edusa*, *S. convolvuli* has appeared in considerable numbers, one gentleman alone having taken over twenty; and records keep coming in of solitary specimens captured in all manner of strange situations, chiefly by persons unacquainted with the prize they have come across.

London, 21st September.

NOTES AND OBSERVATIONS.

NOTE ON COCCYX FINITIMANA.—I have recently gone over the whole of the captures of lepidoptera made by E. R. Curzon, Esq., during the summer of 1885, at "Hoy," one of the Orkney Isles, and shall later on send my observations thereon. These remarks may or may not tend to dispel the illusion which speculative writers seem imbued with, as to what they call northern insects being always darker than what they call southern forms, but my present object is to treat of the peculiar manner in which *C. finitimana* feeds; and I leave the other items for future "matter" for the *Young Naturalist*. Of *C. finitimana*, a fine series was bred and set, the larva mines the terminal leaves of *Arctostaphylos uva-ursi* (which grows high up upon the hills), just mining one leaf, making it appear bladder-like, then attaching the edge of the mined leaf, to the edge of the unmined leaf next on the stem, it eats into it, living in both leaves until it has eaten room in its new home to live in; the old leaf is then deserted. Whilst the excavation is going on, another or other leaves are growing above the mined one, and they are ex-

cavated and occupied successively until four or five sack-like discoloured and contorted leaves can be seen, with one or two young terminal leaves above them. The whole of the four or five excavated leaves are slightly joined together, so that the larva, which never leaves its home, can live and feed continuously from the moment of entry to the pupa state, free from fear of bad weather. The pupa lays in the upper leaf-sack, and on the insect emerging is porrected two-thirds out of its recent puparium. The larva is stout; head, brown; body, cinereous; feeds in June. Pupa rather light coloured; imago end of June or July. This is one of the most interesting discoveries of 1885, so far as I know the work done this year. The species was taken rather freely in the Rannoch district many years ago by a man I sent up there, but he failed to find its larva, though in searching for it he found and sent to me many larva of *Euchromia arbutana*. I had requested him to send me the tied-up terminal shoots of the *A. uva-ursi*, and he did so, and from them I bred plenty of *E. arbutana*, but it now evident he cared nothing for the bladdered leaves on the terminal shoots, and so left them as dipterous.—C. S. GREGSON, Rose Bank, Liverpool.

ANARTA MYRTILLI WITH TWO PARASITES.—Mr. F. N. Pierce has very kindly sent me some parasites from *Anarta myrtilli* larva, and has asked the question "Is it a common occurrence to have two different pupa from the same larva? Reply.—It is a very rare occurrence to have two direct parasites from one larva, in this instance one cocoon is an ichneumon and I believe a *Paniscus*, the other a dipteran, probably an *Exoristes*. It must be understood that we often get two species of ichneumon from very similar pupæ, for instance you may get half-a-dozen pupæ from one larva, the pupæ made by the same species, therefore would be alike; but in breeding we often find that three may be of one species and three another, one species being a parasite on the other. I remember once having six parasites from *Grossulariata*, the pupæ were those of *Casinaria vidua*, but I only bred one *vidua*, the others contained two species of hyper parasites, *Mesochorus fulgurans* and *olerum*.—G. C. BIGNELL, F.E.S., Stonehouse.

NOTES FROM DERBY.—In company with a friend we set out for a ramble in search for larvæ, we walked from Derby to Little Eaton, a distance of four miles along the canal, but did not find anything of note but a species of *Donicia*, on the weeds in the canal. When we arrived at our collecting ground my friend had the first find in the larvæ of *Acronycta rumicis*, and we soon found about a score between us; a little higher up the lane we found the larvæ of the Buff-tip (*Pygæra bucephala*) on some oak trees from which they had cleared the leaves from several large branches. From the

lane we made for the moor where we worked amongst the heather. At every stroke of the sweeping net we found the larvæ of *Eupithecia nanata* in adundance, and occasionally *Anarta myrtilli* and *Agrotis porphyrea*, and hosts of other insects, amongst which was a splendid specimen of *Eperia quadrata*, which we did not leave behind. Will some readers of the *Young Naturalist* give their opinion on the best means of preserving these? They do not look well in spirits and I know of no other way of preserving them. *Atropos* has been fairly abundant, I have had two larvæ brought me to the Museum, found in gardens near the town, and have heard of several more being taken in the neighbourhood. *Sphinx convolvuli* has put in an appearance, I generally get one or two specimens most seasons brought me, but they are often in poor condition the captors generally not being entomologists. *Cirrhædea Xerampelina* has been captured several times on lamps outside the town and I know one collector who has been so fortunate to take five pupæ of this splendid insect. I think Mr. T. Hey has been the most successful collector this season at Derby in taking three larvæ of *Acronycta alni* in one afternoon's collecting, two off willow and one off alder; the larvæ of this rare insect seems to feed on any tree or shrub, I have taken it on sloe, it has also been taken here feeding on hawthorn, apple, and several other trees and on bracken. I think by the great abundance of larvæ there seems every prospect of a good season for entomologists next year.—G. PULLEN, The Museum, Derby.

RARE HAWK MOTHS AT HARTLEPOOL.—We have had quite an extraordinary number of rare Sphinges here this season. Mr. Gardner's capture of *Nerii* was recorded in the August number. Last month I recorded *Convolvuli*. Since then several more *Convolvuli* have been taken and more seen. One was brought to Mr. Gardner so soon after emergence, that the red fluid they emit after leaving the pupa case, came from it after it reached him. This specimen must have fed on *Convolvulus sepium* in one of the gardens where it was taken. A specimen of *A. atropus* was picked up on the beach among seaweed and other rejectamenta, by a boy, and given to Mr. Dixon. Another specimen, very large and in good condition, was brought to me on the 14th September. A day or two later I heard of a "curious butterfly" having been taken in a shop in Northgate, and on calling to see it found a very nice *C. celerio* pinned against the shop shelving. It had flown into the shop on September 12th, attracted no doubt by the lights, was captured and pinned alive against the shelving, where it lived four days. Except that it is rubbed on the thorax it is in good condition, and is a welcome addition to my series. *Galii* and *Livornica* have both been taken here in former years, should this meet the eye of either of them, they will receive a welcome recep-

tion either from Mr. Gardner or I, if they will visit us again.—JOHN E. ROBSON, Hartlepool.

C. CELERIO AT CROSLY.—On the 17th September, one of the scholars at the Merchant Taylors School, Crosley, told me that he had caught a hawk in his garden, which he had never seen before, he described it as having a white streak on its fore-wings, and black and pink under-wings. I expected *Galii*, but was surprised when he brought to school a very fair specimen of *Celerio*. He told me he found it on Wednesday, the 16th September, struggling in a spider's web. The wings on one side are a little rubbed and there is a lot of spider's web twisted about its thorax and legs, otherwise it is a good specimen, but, of course, impaled upon a large pin. As he is not a collector he presented me with the insect.—G. A. HARKER, Holden Road, Blundell Sands, Liverpool.

SPHINX CONVULVULI AND CHÆROCAMPA CELERIO AT HARWICH.—On 31st August I secured a fine *S. convolvuli* at rest, and on the 13th September I had a fine specimen of *C. celerio* brought home alive, it was caught whilst flying in the bar of the "Queen's Head Hotel" Dovercourt, it is in very good condition.—F. KERRY, Harwich.

ALNI AND CONVULVULI &c. NEAR WELLINGBOROUGH.—I have had the pleasure of taking a larva of *Alni* a few miles from here, I also obtained two fine specimens of *Convolvuli* here. Several *Edusa* have been taken at Northampton. I think it has been a good season for insects. I have bred 36 or 37 species and have some 700 larvæ still feeding.—J. BATES, Orchard Terrace, Wellingborough.

VITALITY OF LARVA OF M. STELLALARUM.—The other morning when giving larvæ of this species fresh food, I accidentally dropped one of them among some water; about three-quarters of an hour afterwards I found it, apparently quite dead, I took it out, thinking it would do to preserve, dried it and laid it down. In about a minute I observed a slight movement, and in less than five it was eating its breakfast. It had been totally emmersed all the time.—JOHN E. ROBSON, Hartlepool.

LARVA OF CHÆROCAMPA CELERIO NEAR TENBURY.—A larva of this rare hawk has been found in this neighbourhood. I hoped it would have come into our possession, as the gentleman who has it is not an entomologist, but but he is desirous of watching it through its changes. It is now a pupa, and I hope to hear of it in the perfect state ere long.—(Miss) N. PRESCOTT DECIE, Tenbury.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A., F.S.Sc., &c.

NOVEMBER.

NOW sad the change which comes o'er nature's scene,
The butterflies, which lately we have seen
Flitting from flower to flower, have vanishèd,
And the erst active insect world seems still and dead.
The leafless twigs are dripping all around
The mossy trunks, and on the sodden ground
The rain drops fall, as if the trees each one
Was weeping for the summer time that's gone.

To those who only see the surface of things, the task of portraying the aspect of the insect world in November, doubtless seems a very easy one. "Insects in November!" says the unobservant reader who only sees such objects in his daily walk as he cannot help seeing, "Insects in November! Why there are none; they're all dead and gone." And really to a casual observer it seems so. Ladybirds, humble-bees, dragon-flies, hoverer-flies, butterflies, moths, and the thousand and one other insects which were so conspicuously visible in the summer and autumn, no longer give animation to a country walk, and seem to have completely disappeared. But come with me on an imaginary ramble on a November day and we shall see there are many more insects to be found than one not an entomologist would suspect.

It will be necessary for us to take with us an ordinary garden trowel, a tin box, a blunt strong-bladed knife, and a small square sieve, for pupa digging and chrysalis hunting will occupy a large portion of our time, and we shall find all these useful to us. I like small oblong tin boxes, such as cartridges are sold in, better than any, as they pack up well, and I prefer to take several of this description rather than one large one. The little square sieve I have just mentioned a tinman would readily make for a few pence, and it is very useful for finding small pupæ in loose dry earth. I recommend a square form as being easier to pack up, and if made of such a size that four tin boxes

such as I mentioned will fit in it, side by side, the whole can be packed in a bag without trouble.

The day we choose for our entomological outing is one neither very wet nor very cold, in fact it is as fine a day as we can expect in November; and I have mostly found a fair proportion of days even in this most moist, foggy and disagreeable month, on which an entomological excursion could be made without very much discomfort.

Should the weather be fairly dry—and in some years we do have a less moist November than we have in others—I have found this month a very good one for pupa digging, and perhaps a more productive one than any, for underground pupæ have many foes—moles are especially most destructive to them, and devour them by thousands—so that even the commoner kinds get scarcer when we get over Christmas; and in some places where moles abound, you may spend hours digging about the roots of trees and not find a single chrysalis after all.

We will commence operations at this willow tree, growing in a hedge. First, we will search on the bark for the hard woody cocoon of the Puss moth (*Cerura vinula*.) See, here is one, looking somewhat like half a walnut, stuck in a crevice of the bark. It is fixed very tightly, and we shall need our blunt, strong-bladed knife to remove it.

Now we will lever up the sods of grass round the roots of the tree, and pull them to pieces for the pupæ of *Teniocampa instabilis*, of which I have found as many as twenty sometimes round the roots of one willow tree. Here are one, two, three, four, in this one sod, and here are five more in another, but you digging on the other side of the tree have not found any. "How is that?" you ask, when I have found nine in two sods? "Because I have been digging on the north side of the tree and you have been searching the south side." "Is then the north side of a tree the best for pupæ?" you ask. "I have always found it so. Did you notice that I found the Puss moth cocoon on the north side of the trunk? I suppose it must be a wise instinct which leads the caterpillar to prefer that side for its pupal change on which the sun shines the least, for otherwise the rays of that luminary might cause the moth to break from its pupa before its time, and at a season when the cold nights would be fatal to it. Or it may be because the north side of the tree is the mossiest." "I suppose then it is never any use to look on any other side?" "No, I will not assert that. I only say that my experience is that the north side is generally the most productive. I do not say I never find pupæ on the other sides of the tree, although I seldom do."

But now having carefully pulled the sods to pieces, and thoroughly examined them for *instabilis* pupæ, and searched immediately beneath them for

the chrysalides of *Pterostoma palpina*, we will dig the earth about and possibly we may find something else. Yes, here is a large red-brown glossy pupa, which you infer from its size must be that of a hawk-moth. You are quite right, it is the chrysalis of the Eyed hawk-moth (*Smerinthus ocellatus*). I generally find one or two also under the apple trees in our garden. It seems curious the larvæ should feed on both willow and apple—trees so entirely dissimilar—and the strangeness is not decreased by the fact that the caterpillar is not an indiscriminate feeder.

And here we have another large pupa, but not by any means so large in size as *ocellatus*. It is not another hawk-moth pupa as you seem inclined to think, but the chrysalis of the Buff-tip moth (*Pygera bucephala*). We find it also under lime, oak, and other trees.

You have been digging, you say, under the hedge and have found some pupæ which seem to you like *instabilis*. You are right, they are *instabilis*. You notice there are several sloe bushes about, and upon these the larvæ may have fed.

We will next pay a visit to yonder oak tree. The roots on one side are covered by an interlacing growth of brambles, so it is just the place to look for the pupæ of *Cymatophora ridens* among the dead leaves and bits of wood, and among these fallen leaves we may perchance find the chrysalis of *Selenia illustraria*—it is enclosed in a very slight cocoon. Now we will lever up the sods and pull them to pieces, just as we did under the willow tree, and we shall be pretty certain to find *Teniocampa stablis* and possibly *munda* also. Among the other pupæ to seek for under oak trees are those of *Noto-donta trepida*, *N. chaonia* and *N. dodonæa*, and in their localities we may dig for the pupæ of the rare *Nyssia hispidaria* and the very rare *Boarmia consortaria*. In addition to the chrysalides already mentioned, we may not improbably find that of the Lobster moth in a cocoon among the fallen leaves. The caterpillar of *Stauropus fagi* pupates on the tree within three or four leaves which it unites with its cocoon, and when these fall off the chrysalis of course falls to the ground with them.

Here is a reddish-brown moth, resting on the trunk of our oak tree, which we at once recognise from its pale lines as the Chestnut (*Cerastis vaccinii*). This is not the only moth we may find in mild Novembers, for there are the Dark Chesnut (*C. spadicea*), the Satellite (*Scopelosoma satellitia*), the Scarce Umber (*Hybernia aurantiaria*), the Mottled Umber (*H. defoliaria*), the Winter moth (*Cheimatobia brumata*), and the December moth (*Pæcilocampa populi*), and in their localities the rare *Dasycampa rubiginea* and *Hoporina croceago* may be looked for. *Dasypolia templi* may also be found in the north of England under stones.

Among the smaller moths *Oxygrapha scabrana*, *Peronea tristana*, *P. rufana*, *P. cristana*, *Chimabacche phryganella* and *Lithocolletis trifasiella*, may still be met with if the weather be mild. Besides these the second brood of *Lyonetia Clerckella* appears in gardens and orchards, but soon hibernates.

Here is a stray larva of *Urapteryx sambucaria* on this elder bush. We see, however, it is a full-grown specimen and about to pupate. The finding it reminds me that we may as well look on the leaves of those Speedwells (*Veronica chamaedrys*), for the flat case of *Adela fibulella* as the larvæ are now full-grown. The larvæ of *Gelechia subocellella* may also be found now and are remarkable for forming their cases of marjorum flowers through which the little caterpillars push their heads.

Were there any birch trees near here we might look among the fallen leaves at their foot, for the slightly spun cocoon of *Cymatophora fluctuosa* and for those of *Notodonta dictæoides* and *dromedarius*, the two last of which are attached to the underside of fallen leaves, and most likely we should find under the same trees the pupæ of *Notodonta camelina*.

But the rain which has been drizzling for some time comes down now with such violence that we are compelled to beat a retreat, and bend our steps homeward.

TEN DAYS AT CHALFORD, GLOUCESTERSHIRE.

By F. N. PIERCE.

This district, to which I paid my first visit, from August 22nd to September 1st, is very rich in ancient buildings. On our arriving at Gloucester we immediately made for the Cathedral, which is a very magnificent building. A great portion of it has been restored, and the carving, both ancient and of our own day, is very beautiful. It contains many interesting relics. The cloisters, which are very large, and in the form of a square, have the ceilings beautifully carved in the Gothic style; we took them to be plaster, but were informed by the guide that they were all carved stone. Most of the windows had modern glass, but one part called the "Lady Chapel," had the original stained window, very much damaged, and repaired by pieces of clear glass, with the exception of the colours being much darker, and the representation being almost obliterated, it did not differ much from an ordinary stained window. This chapel had evidently been a most beautiful one, but had been

completely spoiled by the Puritans. All the magnificent carvings are hacked and broken, as far up as it was possible for them to reach. There were a great many niches which had contained figures of both stone and silver, as we were informed, but all the figures had been carried off, and the ornamental part of the niches wilfully smashed to pieces. The ceiling being too high for easy reach was perfect, it also contained a full-sized bog-oak carving of Robert of Normandy, which was in grand preservation, the colours being very bright. But enough of the Cathedral. We soon found ourselves spinning away to the station of Brinscomb, about four miles past Stroud, arrived there we found ourselves in a most beautiful valley, with houses dotted here and there on each side; the top is called table land, and is perfectly flat for miles, and highly cultivated. Several of the large commons have been absorbed by the landowners, and are not now open to the collector. There were several woods around, but nearly all comparatively new; the trees most grown were ash, larch, hazel, beech and fir, an oak being quite a rarity. A canal and railway ran along the bottom of the valley, and along the canal at frequent intervals there were mills, manufacturing rags, silk, sticks, flour, &c., which sent off rather too much smoke for my fancy, and reminded me too much of our own busy town. Having secured suitable lodgings, we unpacked our traps, and started off up Cowcombe woods, which lay just behind our house. We were now ready for whatever might turn up. Moths seemed decidedly scarce; a wild thing dashed past, and on boxing it found it to be *Hepialus sylvinus*, and almost at the same moment, my brother called out "What's this?" this proved to be *Melanippe procellata*. At this point we were interrupted by a keeper, but a pipe of tobacco secured us peace for the evening, and an invitation to come up the next day and as often as we liked. Our other captures consisted of a few *Fluctuata* and *Xanthographa*, not a very brilliant lot for the first night.

The next day we followed up the canal, and were charmed with the great abundance of butterflies, I never saw anything like them. *Satyrus megæra* swarmed along the walls; while *Lycena alexis*, *Vanessa urtica*, *Polyommatus phlaeas*, *Satyrus tithonus*, *Chortobius pamphilus* and *Satyrus janira* flitted along the sides of the paths; and *Vanessa cardui*, *Io*, and *Atalanta* would dash past or rest on the flowers of a large species of wild thyme; and *Satyrus aegeria* would flit among the trees in the woods. I took one very nice *Io* in which the white on the eyes of the hind wings has spread very considerably, leaving the black spot, in which there is a little blue, very small; this was greatly admired at the meeting of the Lancashire and Cheshire Entomological Society, where it was exhibited. Over a little patch of wild mint in flower in one place I took a few *Aurata*, and one *Phytometra cenea*. This

place was on the slope of the railway bank, and was very stony. My brother was also waiting for the *Aurata* to fly over the mint, when he suddenly threw down his net, uttering a loud cry, and found himself covered with little ants, which appeared to be of opinion that human blood was particularly refreshing on a warm day. These little creatures clung so fast and bit so hard, that he had to take off his trousers, socks, and shoes, before he could get rid of them—nor could I persuade him to come with me again for more *Aurata*. The canal furnished hundreds of drowned *Pyrales*, but so damaged were they that I had a difficulty in making them out to be *Paraponyx stratiotalis*. I used to come up along the canal bank at dusk to try and take them on the wing, but did not succeed, and at the end of a week I had only two miserable specimens which I had rescued from the canal, along with one *Ennomos angularia*. Then I discovered how to take them, and could have obtained any quantity. I found they rested during the day on the stonework of the canal just above the water, and near the lock gates, and succeeded in getting a good series before I left. About four miles up the canal was an older wood than the others, and here I saw *Gonepteryx rhamni* swoop down and settle on a oak bush about two feet high. Soon after a fritillary rested on the wild thyme one moment, just long enough to show me that it was *Argynnis Paphia*, so worn as not to be worth a pin. Then a light brown butterfly darted past and across the canal, I shouted to my brother "Did you see that?" "Yes, what is it?" "Dont know, should fancy it is *Selene*, only its too late for it," and it certainly looked more like that than any thing I knew; I saw two more, when one day the following incident occurred which gave me the opportunity of identifying this species. We were down in a valley, with the hills on each side so steep that it was almost impossible to walk down, and to add to the difficulty the place was thickly overgrown with deadly nightshade, burdock (which was just ripe enough to catch and cover you with its clinging burs), thistles, and agrimony. My brother said "there's one of these yellow things," and sure enough about half-way up was one of these *Selene* looking insects, I then said I must have that to see what it is, and instructing my brother to mark the place I ran along to a bridge and quickly crossing the canal climbed up, when half-way towards it my brother shouted "it is off, up higher as fast as you can," so away I scrambled up to the top, when it settled in a few yards enabling me to get a view. "By Jove! its *Edusa*! mark him well, I must have him." Just as my net is nearly over it, off it sailed to the very bottom. The canal prevented my brother getting at it; he called me down, and away I scrambled again and again, and had almost reached it when off it starts, again up the hill and I after it. At last it settles near the top and I was soon within

reach, one pause, one stroke, and *Colias edusa* is mine.

On the high ground we found *Lgcæna agestis* fairly common, some of them were very brightly coloured. We beat a few *Boys urticalis* out of brambles and nettles, but they were much worn. *Cidaria immanata* and *Larentia olivata* occurred in the woods, of the former I took one very fine variety, but unfortunately it is a good deal rubbed. In one of the woods on the higher ground we took one *Ephyra omicronaria*, and spent a long time looking for more but were unsuccessful. *Coremia ferrugata* and *Melanippe fluctuata* were by far the commonest Lepidoptera seen. I took some very dark specimens, one being a particularly nice variety. I was surprised to turn up *Asthena Blomeri*, but found by Stainton, that I was quite in one of its recorded localities. I only got four, but no doubt I was a little late for them. The evening work was dull to a degree, although I treacled unsparingly, the only insect I took was one *Cerastis vaccinii*. On the wing things were fairly exciting, just at dusk we took one each of *Plusia chrysis*; over the brambles *Triphaena ianthina*, *Noctua rubi*, and *Abrostola urticæ*; *umbrosa*, and *xanthographa* occasionally fell to the net; and *Cilix spinula*, *Coremia propugnata*, *Emmelesia unifasialis*, *Eupithecia subfulvata*, *Larentia pectinitaria*, *Melanippe procellata*, *Scotosia dubitata*, *Ypsipetes elutata*, *M. rivata*, and *L. salicata* were taken sparingly during our stay. Among the Micros, of which I had expected a good harvest, I absolutely took nothing, *Stratiotalis* before mentioned being the only plentiful species. We also took specimens of *Teras caudana*, *Peronea sponsana*, *P. viregana*, *Phoxopteryx lundana*, *Xylopoda fabriciana*, *Tinea tapetzella* and *Hypenodes costæstrigalis*. Larva of *Vanessa urticæ* were very common on nettles; we also found larvæ of *Abraxas ulmata* on elm, *Acronycta rumicis* on thistles, &c., one *Venusia cambricaria* on hazel, and full-fed *Arctia menthastris* rushing across the towing path of the canal to spin up, but they were nearly all ichneumonised.

We were in quite a historical part of the country, for within a stone's throw from our lodgings was the house of Saint Mary's, where Roger Bacon the great chemist, was born, and studied his then called black art, and had his famous bronze head, with which he was said to converse and from which he is supposed to have learned so much. The people about here were very superstitious. Of course, this house was haunted, one room had never been opened since the death of some ancestor of the present owner (I forget his name), who had mysteriously died or been killed. And we ourselves slept in a room, which we afterwards discovered, was supposed to be haunted by our landlady's mother. Whether it was or not, she did not bother us; perhaps we were too tired, and too sound asleep to be awakened by a spirit's gentle touch. On the other side of the hill was Squire Dorrington's residence, and

it was here that the notorious Guy Fawkes planned the plot to blow up the Houses of Parliament. This house had several shot marks, which it had received from the cannon of Oliver Cromwell. We went one day to Cirencester Park, the seat of the Earl of Bathhurst. This was the finest wood we saw, and some of the rides reminded me of the New Forest, but as it was a constant rain during the whole of our walk to and from the park, and while there, I did nothing entomologically. This park contained Alfred's-Hall, built of some stone with deep round holes in it, large enough to put your two fists in, which gave it a very singular appearance. Outside the hall was a curiously carved old fireplace, with its inscription in Latin "restored by Alfred," with the date "A.D. 1085, but the letters were distinctly modern block letters, and I afterwards found out that the whole place was only a good imitation of an ancient building, and was built about 1700 to 1750, by Earl Bathhurst.

I have mentioned a few of the most interesting sights, but the neighbourhood is so full of curious old churches and other interesting objects that if I attempted to describe them I might fill an entire part. We had the good fortune to fall in with a gentleman who knew the district, and gave us interesting anecdotes of all the antiquities around, it made us more thoroughly enjoy our ten days stay at Chalford, in Gloucestershire.

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THE LEPIDOPTERA OF LONDON.

By ERNEST ANDERSON.

(Concluded from page 207.)

Continuing our list of *Noctuae* we find that *Xylophasia lithoxylea* (Light Arches) and *X. polyodon* (Dark Arches) are both common, the latter sometimes being very abundant. Very little is known of these two species in the earlier stages and a good account of their life history would be of considerable value; the perfect insects are found throughout the summer. The next on our list is *Mamestra brassicae* (Cabbage Moth), a species that will not require any detailed description since it is too well known to everybody, the larvæ appear in the autumn and will eat almost anything, they vary very much being found of all shades between green and black. Another common moth is *M. persicaria*, the beautiful velvet green or brown larvæ of which are also found in the autumn, feeding on privet and many low plants, the moth is on the wing in June and July and is very fond of sugar. *Apamea basilinea* is

another species which is frequently observed in the perfect state but its existence in the earlier stages is a mystery, the larvæ never being met with, and this remark will apply to *A. oculea* which is another common species and also to *Miana strigilis*, *C. morpheus*, *C. blanda*, and *C. cubicularis*, all of which are frequently taken in London. The life history of our next species *Agrotis exclamationis* is however well known, the large white larvæ being frequently dug up in the spring when the ground is being broken up after the winter; they turn to a bright red pupa, and the moths emerge in June and July. It is almost unnecessary to say that *T. pronuba* occurs, being frequently observed in the heart of the city; and a pretty little species which must not be overlooked is *Noctua plecta* which first appears at the end of May and continues about until the middle of August. Another of the same family *Noctua C.-nigrum* is sometimes taken but it must be considered a rarity. In the neighbourhood of elms we can generally obtain *T. stabilis*, the larvæ being frequently observed on the trunks during July. The beautiful Angle shades moth *P. meticulosus* also favours us with its presence during the autumn months, the larvæ having previously fed up on any low plants in July and August; its neighbour *Euplexia lucipara* also puts in an appearance in an irregular sort of manner being common in some years and conspicuous by its absence in others.

We now come to *Hadena oleracea* (Bright line Brown-eye moth) this is probably the most abundant species of its genus, being found in profusion both in the larval and perfect state, frequenting gardens and waste places and feeding upon any low plant; *Chenopodium* being an especial favourite. The perfect insect appears towards the end of May and can be observed down to the beginning of July; it is not given to variation but the larvæ are found of almost every shade of green and brown, from pea-green to olive, and from wainscot brown to black. It has been stated that the brown caterpillars produce male moths, and the green ones females, but I have not verified this statement which, however, I have no doubt is correct, as I have found such to be case with the larvæ of *Mamestra persicariæ*, they can be easily identified by the presnce of numerous little white dots in the centre of each of which is a minute black speck; the spiracular stripe is well defined and usually of a bright yellow colour. These larvæ may be sought in any place where there is a patch of green, in fact perhaps no species has better adapted itself to town life, they are found during August and September, going underground at the end of the latter month, the pupal state lasting about seven months, there being only one brood each year.

Our next species is *Hadena chenopodii* (Nutmeg Moth) though not so plentiful as its congener *H. oleracea*, this species is tolerably abundant, being

found about the same time namely June and July. It comes readily to sugar but is a wary insect flying off at the slightest alarm. During the day-time it is frequently observed at rest on fences, etc. The larvæ feed in the autumn upon *Chenopodium* and other low plants and are easily identified by the spiracular stipe which is white with a narrow line of pink in the centre; when young this is a very beautiful larva, but when full fed all the colours become very faint and ill defined. The pupa is of a yellow colour and is very transparent, remaining so until very shortly before the emergence of the imago. It may be dug up in our gardens during the winter months. The cosmopolitan *Plusia gamma* of course extends its visits to town, both imago and larva being common. At the electric lights this species is frequently very abundant, in fact, I think large numbers must get killed from their frantic efforts to dash through the globes.

Our last species is *Mania typica* (The Gothic Moth) it is very commonly to be met with in our gardens, hiding during the day under eaves and ledges, and appearing at night in abundance on the flowers and also at the sweets prepared by the entomologist. It is the larvæ of this species that so disfigure the leaves of our garden plants during April and the early part of May; they apparently will feed upon almost anything but are extremely fond of the Purple Iris or "flags," in which they leave large gaps, each gap representing one night's meal, as they invariably begin in a fresh place when possible. At day-break they hide themselves at the roots, burrowing for a short distance under the earth, or amongst any rubbish that may be about; consequently they are not frequently seen although so abundant. The Moth is on the wing during June and July; the larvæ are hatched during the autumn and hibernate when still very small, feeding up in the spring as described, the pupal state being of very short duration.

I have now enumerated over 60 species of lepidoptera which can be obtained in town by the Young Naturalist and am well aware that I may have overlooked several species, while if the Micros are added the number would be doubled. I may perhaps be able to continue this list at some future date or perhaps some one more competent will do so in the meantime. A similar list of coleoptera would be much appreciated.

London.

NOTES ON INTERMEDIATE VARIETIES
OF LEPIDOPTEROUS INSECTS.

By C. S. GREGSON.

In Mr. Robson's interesting paper on this subject (*Young Naturalist*, page 209) certain startling suggestions are worked out to his satisfaction, but as I fear the facts are against his line of argument, I think it will be quite logical if I recapitulate some of the facts that our young friends may not be led into error. Many years ago, a then leading member of the "Entomological Society," of London, having received black varieties of *A. betularia* from me, now known as "*Doubledayaria*," exhibited them at a meeting of the Society, observing there were no intermediate varieties, and to that *little* observation, published in our magazines next month, may be traced the whole of the assertions which have so often cropped up: "There are no intermediate varieties." I pass by the quotation from Lord Walsingham's speculations as the cause of dark coloured insects in high latitudes, because I have never seen his paper; and I shall not follow Mr. Robson's interesting paper, but at once write out a number of species—African and British—from my own knowledge, so that the readers may judge for themselves as to whether there are species which produce intermediate varieties or not. I shall be exceedingly pleased to hear from as many of the readers as possible what species other than those I shall name, they know to have intermediate varieties. The species I shall name have all intermediate varieties in my own collection, and in some cases I possess long series of such.

AFRICAN INTERMEDIATE VARIETIES.

Diadema chrysippus, from Natal, South Africa, is small and dark, like European; from Cameroons, West Africa, it is large and light coloured, vary from variety *missippus* and *semialba* with dusky to light whitish underwings, to variety *alba* with pure white underwings, except only the central spot and marginal band. All these forms I have seen annually, thus they are reproduced intermediate varieties.

Papillio mecroepe, known as *P. hypococon*, varies from rich dark brown and white, to rich brown and ochre. In West Africa the form is generally the first, sometimes the underwings are slightly rayed with ochreous; whilst in South Africa the ochreous colours are intensified, and in a series many intermediate forms occur. Again, in the genus *Harma*, male specimens from Cameroons and from the mainland vary so much that I have repeatedly thought them different species until I got intermediate varieties.

BRITISH INTERMEDIATE VARIETIES (Butterflies.)

I possess several specimens of intermediate varieties of *Colias edusa*, between it and the variety *Helice*, the colours being rich canary yellow or lemon, not straw colour. Of *Phleas* I have a long row varying in all sorts of ways, from three wings normal one silvery, to pure argent. Again, underwings without any red or other colours, underwings streaked with red (several), underwings jumped with red, underwings with narrow borders and several specimens so dark that the red merely appears as suffusion on the disk; now with confluent spots, then almost without spots.

Melitæa artemis.—This species is exceedingly variable. Some localities producing dark well marked but smallish specimens, other localities large and dark specimens. In North Lancashire, near Hawks head, they are exactly like the Irish named variety; whilst I have specimens from near Liverpool large, light, the variety *provincialis* of authors.

Liminites sybilla.—This is not a variable species, nevertheless, sometimes the white band is broader or narrower, sometimes so faint as to be hardly perceptible, with varying obliteration of the band until it is lost.

Chortobius davus varies from dark brown to light, almost white, and its ocelli and underside marking varies from numerous ocelli to entirely wanting on either side; whilst the broad broken band on the underside, variety *Davus*, Fab., is a continuous band in variety *Typhon*, Haworth, but in some Orkney specimens it is a mere triangular light mark on a dark olive green underside, the upper side without ocelli and as light as Cumberland specimens. In Wales again, it is darker than in Lancashire, every intermediate colour, number of ocelli and underside markings can be taken by merely going from a dry to a wet part of the same mossland.

In a question of this kind I think we can hardly forget *Ly. agestis*, W.V. has an intermediate variety in *Salmacis*, Steph., between it and *Artaxerxes*, Fab.; whilst *alexis* runs from variety *eros* and *icarius* of Steph. to exceedingly well marked specimens, variety *simplonia*, and very large at Hoy. *Sy. alveolus* has several recurrent intermediate varieties between the type and variety *taras*.

Nocturni, Gn. *Smerinthus tilia*.—My intermediate varieties of this variable species were given to me by Doubleday and are grand. They vary from the banded type to no band at all. *A. fuliginosa* at Hoy has no red whatever; here always some red on the underwing, inner margin with a dark outer margin; on chalk, spotty broken margin on underwing. I say nothing of *mendica* except that I possess one with intermediate coloured upper wing, a veritable mulatto, but this as Mr. Robson says is only an isolated case.

lubricipeda and *menthastri* vary like *caja* fugitively. *Monacha* varies from light to almost black, every intermediate variety being seen.

Betularia has every intermediate variety, from nearly white to deep rich cold brown or black : in my two long rows of it they run imperceptibly into each other. *Repandata* has several named varieties and several recurrent varieties not named. Mr. Weir's form from Shetland and *Conversaria* Hub. are the extremes it runs to, between these there are so many recurrent forms that I have had to reject some for want of room in my cabinet. One very dark form from Burnt Wood, where it is ever recurrent should be called *Fumosa*, there, it is always more or less (often more) smoky. *Biundularia* varies from light grey to rich dark smoke colour at Petty Pool Wood, Delemere Forest, and also at Burnt Wood, Staffordshire, every intermediate shade being found freely. *G. obscurata* varies according to the geological formation it lives upon, but as it always eats the same food in all places or dies, this is to my mind the key to variation as a general rule—geological not geographical. When different pabulum is taken a different result may be expected sometimes, but the *food of the plant* gives the insect its variation, more than the latitude it is born in.

I am far exceeding the limits I had set myself, but there are so many species of British moths having intermediate varieties, that there is no place to stop for any one who has made variation his study, I will, therefore, rush on. I need hardly name *H. leucophearia* or *H. defoliaria*, both have recurrent permanent varieties. *Em. albulata* has every intermediate colour, between white and dark fuscous, the smoke coloured ones have been named by Mr. Weir, but I cannot tell where the name begins to apply, they are so very intermediate. I took some dusky ones at Conway this year, they can hardly be variety *Thules*! Weir. *Eup. sobrinata* runs from light to nearly black as bred this year at Hoy, by Mr. Curzon. *Eup. rectangulata* from light pea-green to almost black (here in my garden from the same batch of eggs) in regular gradation. But for real variation commend me to *Yp. elutata*, I have two rows, and Mr. Curzon has brought about the same number from Hoy, hardly any of his are like any of mine, but all are different from each other, yet in both cases they form series of types as does *A. grossulariata*. My collection of varieties of that species are arranged under letters from A to Y. If I were combating Mr. Robson's paper I could shew that that species does go into forming permanent varieties, but my only object is to stop the error that Mr. Sheppard set running off so many years ago, viz. that "there were no intermediate varieties." To do this I will just write out a few other species that have intermediate varieties, and so satisfy the most exacting reader,

M. rubiginata is another species that runs down in intermediate varieties, to the *plumbata* of Curtis imperceptibly, whilst *C. corylata* seems permanent in England, in Scotland it assumes all sorts of intermediate forms to the *albo-crenata* of Curtis. I will not treat on *russata* further than to say the Isle of Arran form being permanent, I have called it *consolidata* because I think every one of its forms are pressed into this. *Immanata* from Hoy seem to be fast passing into a small dark form not unlike it, but in notes on intermediate varieties I cannot omit *Cidaria populata*, which may always be taken on high hills where its food grows, on early rocks it varies in regular gradations, from light yellow ochre to rich unicolorous dark brown, on millstone grit it never gets brown.

I rush on to Noctuæ, Linn. *Xy. polyodon* has every intermediate variety from light ashy to rich brown. *Chareas graminis* is a very variable species, variety *Hybernica* and its varieties are common in Lancashire. *L. testacea* is another variable species; *Crymodus exulis* another, dark brown in Scotland, lighter further north; *Apamea gemina*, *fibrosa* and *oculea*; several *Agrotis* are especially so. *T. fimbria*, *orbona*, and *pronuba* all vary greatly; whilst *Festiva* stands now about the top for intermediate variation; whilst for beauty of intermediate variation *Pachnobia alpina* takes first place; whilst *T. gothicina* variety of *gothica*, have never two specimens alike. *T. opima* is a most variable species, whilst *Xanthia cerago* varies in regular gradations from its yellow citron plain form to rich speckled specimens. Now for *Dionthæcæa carpophaga*, on chalk it is light fawn or buff, on limestone darker, on cambrian darker still; whilst on early rock, quartzite or granite, it is rich dark ochreous browns to cold often purplish browns; my series of two rows run imperceptibly into each other, from a pure pale buff specimen to a rich dark almost black series, say about 60 specimens, with every intermediate variety. The next species I think of as having intermediate varieties is *Epunda viminalis*, my series varies from bright silvery light, gradually to rich smoke black. Like Mr. Robson I could go on *ad nauseum*, if I have not already done so, but holding that what is worth doing is worth doing thoroughly, I will just remind our young friends that any one who knows *Peronea cristana*, *P. hastiana* or *Leptogramma literana* should never say there are no intermediate varieties amongst the Lepidoptera.

Rose Bank, Fletcher Grove, Liverpool.

NOTES FROM A NATURALIST'S DIARY.

By W. H. WARNER.

(Continued from page 164.)

HOUSE SPARROW (*P. domesticus*).—Noticed (November 20th, 1882) an old sparrow introducing a feather into the nest of a house martin (*H. urbica*) built under the eaves of the next house. These mud-built structures afford warm winter roosting-nests for the artful sparrows.

ROBIN (*E. rubecula*).—I once saw a robin's nest containing young, built in the side of a grave mound, in a secluded little churchyard in Bucks. A very queer place indeed for merry "Bob" to nest in.

GOAT MOTH (*C. ligniperda*).—A caterpillar of this moth was found to-day (October 20th) in an adjoining garden, eating into a mangold-wurzel root. These rank-smelling caterpillars are often dug up in this garden. Entomological books, as far as I know, never speak of this caterpillar being found in any other situations than the inner trunks of trees.

VORACITY OF THE PIKE (*E. lucius*).—Talking to a party of fishing, poaching fellows, down by the river this evening (October 22nd), they told me that once when wiring a jack in a ditch they could not find its head, there being a tail at each end; but on getting it out they discovered it had gorged another as big as itself, the tail of the swallowed one sticking out of the swallower's mouth. They also spoke of another case in which the gorger had got its victim crosswise in its mouth.

LARGE HEATH BUTTERFLY (*S. tithonus*).—In Newman's "British Butterflies," when giving the localities in which this species is found, he says he has "no record of its occurrence in Oxfordshire." For the benefit of future butterfly historians I may remark that it is very common in the county.

CLOUDED YELLOW BUTTERFLY (*C. edusa*).—When on my way to a flower show at the neighbouring town to-day (August 14th, 1877), I saw about a dozen specimens of this lovely butterfly fluttering about the flowers by the side of the hedges, and all of them except one specimen were flying in this direction, *i.e.* towards Standlake.

NUTHATCH (*S. Europæa*).—A beechnut, which had been placed in the chink of a wall, no doubt by this bird, has now (May 1st) germinated and thrown out a tender stem and a pair of cotyledons. I also found a yewberry a day or two back tightly wedged in the mortar of the back wall. The Great Titmouse (*D. major*) has a great fancy for yewberries. Of course I am speaking of the seed itself not the scarlet pulpy outside of the berry. The storing habits of the nuthatch have long been familiar to me. See "Science Gossip," vol. 9, page 33.

NOCTULE BAT (*N. altivolans*).—Still on the wing (December 3rd, 1880), or at least what does duty for a wing. This is very late for this species to be seen about, the evening, however, was very mild for the time of year. People in Berkshire call this large bat the “Bat Rat,” and the smaller sorts “Bat Mice.”

BARN OWL AND SNAKE.—I was once told by a young man that he had once found the body of a large snake in an owl's haunt in a hollow tree, no doubt taken there as food for the young owls.

GREENSHANK (*Z. glottis*).—I have a specimen of this bird which was shot in November, 1882, by the River Thames in our neighbourhood. It is not often seen so far inland I believe.

SPARROW AND HUMBLE BEES.—Saw (June 10th) sparrows chasing with great perseverance the large humble-bees sailing along in the air, beating them to the ground and pecking them fiercely. I wonder if they ever get stung? Saw also two or three days later a sparrow beating a cockchafer against the ground, and refusing to leave it, but flew away with it in its bill. Amusing birds are the sparrows.

HOUSE MARTIN (*H. urbica*). A pair of these pretty little twitterers made their appearance this morning (May 28th), and soon began patching up a nest, which had been nearly demolished the year before. Talking to an intelligent old man this evening about the habits of the martin, he said that any one could tell what sort of a summer it had been previously, by merely noticing the colour of the martin's nest under the eaves. If the previous breeding season had been a wet one, the nest was the colour of road-dirt, from the bird getting its plaster from the wet road; but if the summer before had been dry the nest was almost black, from the bird being compelled to use the dark-coloured mud of ponds and pools, instead of seeking its materials on the highway.

WOOD MOUSE (*M. sylvaticus*).—A mouse of this species was killed in a patch of beans in the allotment gardens to-day (March 22nd.) Many of the beans had disappeared, rooks being suspected of the theft, but on this mouse being killed a hoard of beans was discovered in its burrow close by. This specimen was remarkable from being exactly the same colour as the common mouse (*M. musculus*), that is of a grey-brown above, without a tinge of red and greyish below. It had the usual yellowish mark between the fore-legs.

NIGHTINGALE (*D. luscini*a).—Heard one of these splendid songsters singing a little, so late as this, on the banks of the river to-day (June 29th, 1872). The harsh frog-like croak may also now be heard. Every time the bird croaks it jerks or lifts its tail.

Standlake, Oxon.

CAPTURES OF COLEOPTERA AT BATH, DURING THE RECENT SEASON.

By ROBERT GILLO.

As there are comparatively few who collect and study British beetles, I venture to give an account of some of my captures during this season, although it is only the second year that I have been able to devote to systematic work, hoping it may be the means of inducing some earnest lover of nature to devote his energies to this very interesting branch of entomology.

The active season near Bath appears to commence about the middle of March. I have in my diary under date March 16th: "All the usual beetles were abundant under stones; in dung *Aphodius prodromus* and *punctatosulcatus*, also *Tachinus laticollis* and *Philonthus fimetarius*." At the same time I found one *Aphodius porcatus* at the base of a tree. The lazy *Melæ proscarabæus* and *Timarcha lævigata* were to be seen commonly on the hedge banks. The previous season about this time there was a great flood, and as soon as the water in the river had subsided sufficiently I examined the debris washed up in the meadows, and was astonished at the large quantity of beetles congregated together. March 22nd.—Tried sweeping and took *Apion frumentarium*, a single specimen, and *A. fagi* abundantly; also *Megarthus affinis*, *Proteinus brevicollis*, *Callicerus obscurus*, *Prasocuris aucta*, *Sterocorynes truncorum*. March 31st.—A warm day, and beetles very abundant. Took *Anchomenus scitulus*, *Chrysomela staphylæa*, *polita*, and *hæmoptera*. April 2nd.—Took *Liosomus ovatulus*, *Leistus spinibarbis*, *fulvibarbis* and *ferrugineus*, *Bembidium 4-maculatum*, *Stilicrus rufipes*, several of the commoner species of *Quedius*, *Philonthus*, *Xantholinus*, *Lathrobium* and *Othius*, and *Carabus catenulatus*. April 3rd.—Examined the loose stones at the base of the walls on Landsdown and found beetles abundant, such as *Harpalus latus*, *Ocypus morio*, *Pæderus littoralis*, and, of course, the common *Geodephaga*; took several *Megacronus analis* and one *Othius melanocephalus*. April 4th.—I noticed in dung *Aphodius constans* and *fimetarius*. Placed some bones and fish refuse as bait for *Silphidæ*, &c. April 7th.—In the lanes several species of *Apion* were perfectly swarming but the species have not yet been determined. April 13th.—Tried a pond but only took *Agabus nebulosus*, *A. bipustulatus*, *Hydroporus melanocephalus*, and *Haliplus lineatocollis*. April 17.—By sweeping took *Lema cyanella* and *L. melanopa*. April 18th.—*Sitones lineatus* and other species were very abundant in a field of vetches. In a damp field on the fuller's-earth clay *Byrrhus pilula* and *Philonthus varius* were in abundance in moss. April 20th.—In dung I noticed *Aphodius*

luridus, *A. merdarius* and *Hister bimaculatus*. I examined the baits and found lots of *Choleva*, *Homalium rivulare* and *Proteinus brevicollis*. I took *Anchomenus oblongus* in plenty, also *Stilicis rufipes* and one *Badister sodalis*. April 21st.—In meadows I took *Rhinosimus viridicollis* and *Orchestes alni*, and one specimen of *Parnus auriculatus* in a ditch. On a piece of rotten wood picked out of the water I found six *Philhydrus marginellus*. April 22nd.—Examined baits and found more *Choleva nigricans*, *Watsoni*, and others. Noticed *Aphodius ater*, *A. granarius* and *Hister carbonarius*. April 23rd.—I captured *Onthophagus ovatus*, a species very abundant here in sheep dung on the Midford sand. April 27th.—Went to Bitton by train (six miles) and walked home over Lansdown; after working hard and finding nothing I required, I was quite resigned to enjoy the walk as my only reward, when on turning up a stone *Ocyptus fuscatus* came into view. Feeling tired I sat on a log of timber in a field and commenced pulling off the loose bark, not expecting to find anything, when *Rhagium inquisitor* appeared, nestled in its cell. This being new to me I set to work in earnest and soon found five more, after which I went on my way rejoicing. April 28th.—Went to Midford by train (three miles). Sweeping the canal bank produced *Lasia globosa* and *Timarcha coriaria*, one specimen of each, and *Crepidodera rufipes* in abundance, while in a damp place I took one *Badister sodalis*. I noticed *Aphodius pusillus*, and whilst looking for *Aphodiidae* in cow-dung, the coppery elytra of *Onthophagus cænobita* caught my eye, and I secured five specimens. April 29th.—Examined the baits and found *Choleva* as usual and several *Necrophorus humator*, and in the bones *Omosita discoidea* and one *O. colon* appeared. I also noticed *Aphodius fossor*, and took six *Onthophilus striatus*. April 30th.—Went to Mitford again and took six more *Onthophagus cænobita* and a lot of *Philonthus splendens*. Sweeping the canal bank produced *Xylocleptes bispinus*, *Rhinosimus planirostris*, *Choleva sericea*, *Hermæophaga mercurialis*, *Ceuthorhynchideus troglodytes*, *Phyllobius pyri*, *Alophus triguttatus*, several *Hyperæ*, &c. May 7th.—In sheep-dung on the sands I took one *Onthophagus nutans*, and after working for two hours I noticed *Aphodius erraticus*, *A. depressus* and lots of *Onthophagus ovatus*, but no more *O. nutans*. May 8th.—I tried again, and found two *O. nutans* and one *O. cænobita*. May 9th.—Examined the baits and found more *Necrophorus humator* and *Choleva*. In a barren field, on the inferior oolite, I found one *Brachinus crepitans*; *Harpalus azureus* occurred in plenty, along with *H. puncticollis*, &c. May 11th.—In a pathway, under a small quantity of dry horse-dung, I took 21 specimens of *Staphylinus pubescens*. May 12th.—Looked again for *O. nutans*, and after some hours' work found one. *Aphodiidae* were very numerous, as also *Cerycon* and *Sphæridium scarabacoides*;

S. bipustulatus and *S. marginatus* were also represented. May 13th.—When passing along a path by the river I noticed some old Stonesfield slates that had been recently put there to repair the pathway, and found by working among them *Clivina collaris* and *Cryptohypnus riparius* abundantly, *Anchomenus oblongus* and others in any quantity; and I also found *Prasocuris marginellus* congregated on the plants by the water.

May 15th.—Left Bath for a fortnight's visit to the seaside, the place selected being Burnham, a small watering-place at the mouth of the river Parrit, near Weston-super-mare. Here there are good sands and extensive sand-hills (locally called "Tots.") These proved excellent collecting ground. Under seaweed *Philonthus xantholoma* and *Bembidium pallidipenne* were very abundant; *Dyschirius impunctipennis* was running about, often dragging along a minute "staph"; *Metabletus foveola*, *Phaleria cadaverina* and the fierce *Brosicus cephalotes* were very common. On the "Tots" *Calathus mollis* and *C. flavipes*, *Iacon murinus*, *Notoxus monoceros*, *Heliopathes gibbus*, *Agialia arenaria* and *Cneorhinus geminatus* occurred in profusion; and *Sitones griseus*, *Harpalus anxius*, *Microzoum tibiale* and *Limonius cylindricus* were commonly to be seen, vainly trying to crawl up the loose sand. I also took four *Psammодиус sulcicollis* and several *Amara fulva*. In dung *Aphodius inquinatus*, *scybalarius*, *subterraneus*, *haemorrhoidalis*, *fimetarius*, *ater*, *fossor*, *pusillus*, *merdarius*, *erraticus* and *luridus* were more or less common, and *Onthophagus fracticornis* and *nuchicornis* in abundance. Under dried horse-dung that black speck *Carcinops minima* was very common, and since it does not move or show any legs, it is difficult to believe that is a beetle until the pocket-lens is brought to bear on it. On examining some dung in a field inland I found one *Onthophagus vacca*, but could not see any more; however, I noticed that there were extensive flocks of sheep feeding on the Brent Knoll (a round hill about two miles off), and from knowing the outline of the geology of the district I had good reason to suppose that the fields were on the Mitford sand, and as past experience had taught me that the *Onthophagi* prefer sandy soil, and *vacca* occurred in the neighbourhood, I thought I ought to find it there. The next day I walked over and in the first piece of dung I examined found two. I soon obtained as many as I wished. *O. ovatus* and *Aphodius ater* were there in profusion. May 28th.—I noticed *Cicindela maritima* on the sand Tots; it occurs here in abundance in June and July, but although I have taken numbers I have never seen *C. hybrida*.

To be continued.

ARE BUTTERFLIES DISAPPEARING FROM THE BRITISH ISLES?

MR. F. N. PIERCE.

Mr. Robson asks me what I have to say on this subject during 1885, and I put off answering until the butterfly season had closed, in order to give a more complete reply.

Colias edusa.—I saw five specimens during 10 days in Gloucestershire.

Argynnis aglaia.—Mr. Wilding and myself went three times to Southport on July 11th, July 25th and August 8th, for this butterfly, to a certain field where we knew it to have occurred "in profusion towards the end of July" last year, and although we searched in this particular field and all around for it, we did not see a specimen. Can any one *really* explain this?

Vanessa Io.—I knocked one out of ragwort, on September 26th, at Wallasey, while beating for pug larvæ, and heard of another being taken at West Kirby, and "several at Crosby." It was very abundant in Gloucestershire.

Satyrus ageria.—Was in profusion at Gloucestershire this year, also in the neighbourhood of Ruthlin, North Wales.

Satyrus megæra.—I am glad to be able to report that this insect has certainly not decreased in number since 1884, several have been taken at Crosby, Wallasey and Bidston, in fact more than last year. I had not an opportunity for visiting its old locality, West Kirby, this year, so can say nothing. In Gloucestershire it flew off the walls like flies.

Liverpool, October, 1885.

URTICATION CAUSED BY C. PITYOCAMPA.

By GEO. A. HARKER.

In the beginning of last April, I received a notice from the Post Office authorities that a box containing silkworms, addressed to me, was detained at the General Post Office, and if not applied for at once would be destroyed. Unable to go into Liverpool that day I asked Mr. Pierce to get it for me. On enquiry at the Post Office he was shewn the remains of a cardboard box, a nest containing some 50 or 60 larvæ, and a luggage label. The official said that the caterpillars had kept him all the morning gathering them together as they ran over the table. Mr. Pierce did not know what the larvæ were, and sent them on to me. They were in a nest as large as a man's two fists, and attached to a fir branch; the larvæ were black, with two tufts of orange hair

on each segment. A lady, living at Barcelona, had told me that she had seen these nests in the fir trees, on the hills around the city, and had promised to send me a nest. I looked through Kirby's "European Butterflies and Moths," but could find no insect which corresponded with them; and never thinking of *Pityocampa*, I handled the larvæ several times, and experienced no irritation except a little between the fingers, less however, than that caused by our *B. rubi*. Some days after this, looking in Staudinger's catalogue, I came across the name *Pinivora*, and it struck me that it might be this, on referring to Kirby I found that it was not this but *C. pityocampa*, the next insect to it, and said to be the most poisonous of the *Cnethocampas*. I then remembered noticing that the larvæ lay in double rows along the stems of the fir, as is right and proper for "processionary" caterpillars to do. About twenty larvæ pupated, and one day whilst removing the cocoons from the box, I casually touched my face, in ten minutes my cheek began to swell, and the next day a number of white pimples, as large as a pin's head, appeared on my cheek. In a week the skin broke, and a wound which took little less than two months to heal was formed. From the time I touched my face till the wound healed it never ceased itching, at first very badly. There is a mark left on my face the size of a half-crown, consisting of a number of pits like those caused by small-pox, and there seems no likelihood of its disappearing. I bred about eighteen or twenty imagines, nearly all females. The hairs of their tails causes itching between the finger, but none on the thicker skinned parts of the hand. I did not feel inclined to try them on my face. I have little doubt that the hairs of the larva would be very bad if they touched the face, but I cannot say, as luckily none ever touched mine, except those from the cocoon. The dust of the nest has no urticating properties whatever. The lady who sent them said the dust fell over her face and hands, and caused no inconvenience.

Blundell Sands, Liverpool.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting of September 24th was occupied with discussing the life history of *V. polychloros*, and a very interesting evening ensued. Among the chief points debated were the similarity between this and the allied species *U. urticae*, and the possibility of their having had a common progenitor, the comparative rarity of the species near London was also commented on, it having been of very general occurrence years ago. Mr. J. A. Clark brought

up a fine specimen of *S. convolvuli* and Mr. Hockett shewed a living larva of *A. atropos*.

The following meeting was devoted to a friendly comparison of the various styles of setting. This subject is considered a very important one by the members, who desire, if possible, to obtain among themselves a uniform style, so that specimens exchanged may harmonise with those already in the cabinet. At present there appears to be considerable difference of opinion; some setting insects so as to touch the paper, others high up on the pins, and the wings also are set at various angles, so that specimens from different correspondents are frequently totally unlike. Mr. J. A. Clark's specimens of lepidoptera were pronounced perfect in every respect, and the same was said of Mr. Lewcock's exhibit of coleoptera, which for uniformity and neatness could not be excelled. It is hoped that this question of uniformity of setting will be taken up by entomologists in general, as it is certainly an important question.

The meeting of October 8th was well attended, the life history of *V. antiopa* being the subject brought forward. The absence of records of the larvæ was commented on, and an animated discussion took place regarding the impregnation of the female, some thinking it took place before hybernation, others in the spring time like the other species of the genus. Mr. J. A. Cooper mentioned having taken a female specimen full of ova, early in the spring, off the trunk of a birch tree at Box-hill, the specimen being quite numbed with cold so that he took it with his fingers.

A field-day—or rather evening—will be held early in November, when a good muster of members will visit Epping Forest, in search of *H. defoliaria*, *aurantiaria*, and *pennaria*; and on the 12th the annual pocket-box exhibition of specimens captured or bred during the season, will be held at the Society's room. A full account of both will be given in the December number.

ERNEST ANDERSON, Secretary.

OUR LONDON LETTER.

The autumnal beating has proved on the whole rather better than I anticipated in my last, though the season must be considered one of those eccentric ones in which the usual species seem to disappear and are replaced by others not usually common, this, however, is not objectionable to most collectors. *S. convolvuli* and *C. celerio* are still being taken, a specimen of the latter coming under my notice this present week. A large number of *A. saucia* are also about and in fact those who have made good use of sugar during the

past month have been well rewarded. The ivy has also proved fairly productive. Active operations have now almost concluded, and the usual winter round of exhibitions, soirées, &c., are beginning here. The Highbury Microscopical Society had a very successful gathering last week, and the Haggerston Society hold their annual exhibition on November 12th.

London, 22nd October.

NOTES AND OBSERVATIONS.

NOTES ON VARIATION IN SOME SHETLAND LEPIDOPTERA (continued).—On page 15 of the current volume of the *Young Naturalist*, I said when the perfect insects of *D. conspersa* and *Eup. Venosata* emerged "I might write my observation thereon." They having appeared, I may now say that from about twelve young *conspersa* larvæ I have bred ten fine perfect specimens, not one of which could be recognised as *conspersa* at first sight. They have neither the dark or light colours or markings of *conspersa*; they are all more or less ochreous brown and yellow, some with rather lighter markings, two are bright ochre yellow, without any light markings—in fact they are in pairs so that placed five and five, no difference could be observed or choice made between them. Mr. Curzon kindly gave me my pick of either five. I have seen dark Scotch specimens, they are not at all like them. *Eup. Venosata*, small dark smoky specimens, the usual beautiful reticulation of the wing almost lost, dark, *one* and *one*. This concludes my observation on "some Shetland Lepidoptera." If these remarks have tended to make our young friends think for themselves rather than take all they read as gospel, my object is attained.—C. S. GREGSON.

THE FULMAR AT HARTLEPOOL.—Mr. James A. Mann of this town has shown me a very fine specimen of the Fulmar Petrel he obtained on the 12th October here. It was found on the beach, and though alive was nearly buried with sand. He obtained a second specimen a few days later, which was found in a ploughed field not far from the coast. Though both were alive when taken, they were in but a sickly condition and evidently starving, for when skinned there was not a vestige of fat to be seen. It is a very rare visitor to this county, only five specimens being previously recorded (see Hancock's "Birds of Northumberland and Durham," p. 132), all of which have been found on the coast either dead or in a sickly state. Those obtained this season are both birds of the second year. During the gale that has prevailed this month, several other not very common birds have been shot, or

taken on the sands, the most notable being a fine specimen of the Pomeranian Skua, in the second year's plumage; the Purple Sandpiper and several specimens of the Gannet in the first year's plumage. Razorbills and Guillemots have been common.—JOHN E. ROBSON, Hartlepool, October, 1885.

Since writing the above, I had a walk along the beach with Mr. Gardner. Near the mouth of Hezleden Dene I found a third specimen of the Fulmar dead on the sands. It was too much damaged by the water to be worth preserving, but its head was uninjured, and as the construction of the bill is curious and interesting, I have had the head stuffed and mounted by itself, and it looks well. Though the storm had considerably subsided, we met a man who had picked up a living and healthy looking Guillemot, which had been driven ashore. Though these birds can fly, they never seem to resort to their wings to escape capture.—J.E.R.

VITALITY OF LARVÆ OF *P. BUCEPHALA*.—About a week ago I had some larvæ of this species that showed signs of life by moving their jaws and prolegs rapidly, after having been in spirits of wine a few minutes, then in a solution of alum about half-an-hour, and their entrail pressed out.—J. T. RODGERS, Oldham.

LARVÆ PRESERVING.—If Mr. G. Pullen, of Derby, will get Greens's "Insect Hunter's Companion," he will find some very good instructions how to preserve larvæ. I may say that I learned larvæ preserving for two short papers in "Science Gossip," for 1879, pages 58 and 256. If there is any little detail he cannot master I shall be happy to help him.—J. T. RODGERS, Oldham.

EPUNDA NIGRA IN DORSETSHIRE.—On October 6th, my brother Mr. C. Marriot, took a fine specimen of *E. nigra*, at Hamworthy. It was flying round a lamp in a room.—T. F. MARRIOT, George Lane, Lewisham, Kent.

FOX (*E. vulgaris*).—The fox that lurks and skulks about the hedgerows and fields during the day, and robs hen-roots at night, never affords so much sport to the huntsmen as the real wood-fox.—W. H. WARNER.

EXCHANGE.

DUPLICATES—*Cardamines*, *Megæra*, *Urticæ*, *Galatea*, *Edusa*, *Semele*, *Cardui* *Alveolus*, *Zizac*, *Filipendulæ*, *Lubricapeda*, *Polyodon*, *Typica*, *Pronuba*, *Vaccinii*, *L. Comma*, *Mi. Atomaria*, *Elinguaria*. DESIDERATA—*Thecla* (except *Rubi*), *H. comma*, *Sessidæ* (except *Tipuliformis*), *Phycidæ*, *Cannæ*, *Flavago*, *Bondii*, *Petasitis*, *Scolopacina*, *Saponaria*, *Notata*, *Punctaria*, *Blandiata* and others.—H. FRERE, The Treasury, London.

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THE ENTOMOLOGICAL YEAR.

By ALBERT H. WATERS, B.A., F.S.Sc., &c.

DECEMBER.

DREAR Winter-time has come !
The once pellucid pool, above whose face
The agile dragon-flies did lightly skim,
Now frozen hard as adamantine rock,
Lies cold and lifeless 'neath the wintry sky.
And the oak woods, where late the *Emperor* soared,
Are bare of leaf, and from the naked twigs
The icy crystals hang. The verdant sward
Lies buried deep beneath the drifted snow.

Such is the conventional picture of winter-time, but our English climate is the most uncertain in the world, and instead of ice-bound pools, trees white with frost, and meadows buried deep with snow, Christmas-time is as likely as not to present a scene quite the reverse of all this. I have been out many a time entomologising at this time of the year, and a list of the species I have found would astonish by its length those who think December an utterly barren month as far as insect-life is concerned. Not to mention the coleoptera, of which I have always obtained a goodly number throughout the winter, the lepidoptera alone have made quite a long list. Certainly a large portion of them were pupæ, and not imagines or larvæ, yet of the latter the number which are feeding throughout this month is not small. Many of them are certainly internal feeders, and therefore removed from observation. Thus the whitish larvæ of *Sesia crabroniformis* (*bembeciformis*) are living inside the wood of the willow (*Salix capræ*); those of *S. tipuliformis* in the stems of currant bushes; those of *Myelois cribrum* and *Chilo phragmitellus* in thistle and reed stems respectively; and *Cossus ligniperda* in the wood of willow trees.

Other of the winter-feeding larvæ live underground and gnaw the roots of plants, as for instance, the white, brown-headed caterpillar of the Ghost-moth

(*Hepialus humuli*), and that of the common Swift-moth (*Hepialus lupulinus*.) The former seems to prefer dock and nettle roots to any others, the latter feeds indiscriminately on the roots of a large number of herbaceous plants, both wild and cultivated.

But the micro-lepidoptera furnish the bulk of the larvæ which the entomologist may find by diligent search in December. Thus the larvæ of *Halonota cirsiana* live in the stems of thistles, as also do the pinkish ones of *Halonota scutulana*; those of *H. fenella* feed in the stems and roots of mugwort (*Artemisia vulgaris*), and the roots of this plant likewise affords subsistence to the larvæ of *Dicrorampha simpliciana*, whilst another of the genus (*D. petiverana*) finds sustenance the roots of yarrow (*Achillea millefolium*.) The little, pale yellow, brown-headed caterpillars of *Eupæcilia strobilana* feed on the cones of the spruce fir, and those of *E. roseana* live in teasel heads. They are green in colour, with black heads.

The following Tineina larvæ may all be found in December, although some are local and scarce. *Talæporia pseudo-bombycella* in a case on lichens, growing on palings; *Lampronia prælatella* in a flat case on the underside of wild strawberry leaves; *Teichobia verhuellella*, which burrows under the fructification of wall-rue (*Asplenium ruta-muraria*) and hart's-tongue fern (*Scolopendrium vulgare*); *Incurvaria mascullella* and *T. ochlmanniella*, both of which live in flat cases among fallen leaves, the former is by far the commonest. In addition to these may be mentioned *Adela De-Geerella*, which lives in a flat case on wood anemone leaves; the tiny pinkish larvæ of *Gelechia affinis*, with a black head, living in moss on old walls; *G. bifractella* in common fleabane seeds (*Inula dysenterica*), and also in those of plough-man's spikenard (*Conyza squarrosa*); *G. cerealella* in grains of wheat and barley, *G. subocellella* in a case formed of marjoram flowers; *Parasia lappella* in burdock seeds, *P. Metzneriella* below the seeds of black knapweed (*Centaurea nigra*), *P. carlinella* underneath the seeds of carline thistles; *Coleophora juncicolella* on heath in a case formed of small heath leaves, *C. solitariella* in a whitish case on stitchwort (*Stellaria holostea*), *C. albitarsella* in a slender blackish brown case on ground ivy and marjoram, *C. caespitella* on seeds of rushes; and *Chrysoclyta linneella* under bark of lime trees, in colour the last is yellowish white with a pale brown head.

And, in addition to these, there are the larvæ of *Asychna æratella* living inside pod-like galls, occurring on knot-grass (*Polygonum aviculare*); *Elachista gangabella* mining the leaves of rough cock's-foot grass (*Dactylis glomerata*); *Elachista tenuatella* in slender false broom grass (*Brachypodium sylvaticum*), and *Elachista rufocinerea* in the leaves of creeping soft grass (*Holcus mollis*.) All these may be found in mild Decembers, as well as

Tischeria marginea and *Nepticula aurella* in mines on bramble. I might also have included in the list certain species which (like *Endrosis fenestrella*) feed on waste substances in houses.

The moths to be met with in mild Decembers are *Pæcilocampa populi*, *Hybernia aurantiaria*, *H. defoliaria* and *Cheimatobia brumata*.

Gnats are the most conspicuous objects in the insect world in the winter time, not, of course, from their size—ting atomies that they are—but their number. No matter how cold the weather is, or how wet, these little creatures may be seen gyrating about one another in myriads in mid-air. What the object is of their mazy evolutions I am unable to say. It may be sheer play or it may be they are pursuing and catching some minute forms of life present in the air, for transfixing which the long, slender, and barbed trunk would seem well adapted. A wonderful piece of mechanism this trunk of a gnat is, and it will well repay examination with a microscope. The shortened days and bad weather make an entomologist's opportunities for out-door investigation terribly few, but let him devote a few evenings to the microscopic examination of *Culex pipiens*, and if his instrument be a good one, and he gives careful attention to the beautiful details of the structure of the tiny dipteran in question, he will feel he has his reward in the insight he has obtained into the manner in which one of not the least wonderful of the Creator's works is formed in each of its several parts; and if he be a devout man he will rise from his instrument with the pious ejaculation on his lips, wrung from the deepest recesses of his heart—"O Lord, how wondrous are Thy works! In wisdom hast Thou made them all."

It would take a long time to thoroughly exhaust the investigation of the structure of even a tiny gnat—indeed I should say it is impossible to do so with even the most powerful microscope known to the scientific world of the present day. How wonderful in their minute complexity must be those muscles which are capable of moving the insect's wing up and down (vibrating it we call it) at the rate of three thousand times a minute. How wonderful the nerve-force which can be transmitted along such microscopic nerves as a gnat must possess, and communicate motion to the infinitesimally minute fibres.

The microscopist carries on his investigations with feelings akin to those excited in the mind of him who sweeps the heavens with a telescope. The astronomer is appalled by the infinitely great, the microscopist is awe-struck by the infinitely little. How many must the muscles be which a tiny gnat possesses in order that it may accomplish the varied motions necessary for its existence and how extremely minute must each one be! But if the muscles in a gnat's body are inconceivably minute what must they not be in one of

those tiny leaf-mining larvæ—*Lithocolletis quinqueguttella*, for instance—which lives inside the leaves of the dwarf willow in July and September; or *Lithocolletis schreeberella*, which mines the under side of elm leaves at the same time, and both of which are of such tiny dimensions that the moths they develop into do not expand more than a quarter of an inch? If we assume that all internal feeding larvæ are formed on the same model, then we may compare these minute *Lithocolletis* larvæ with the caterpillar of the Goat moth. Now Lyonnet found that the number of muscles in the larvæ of *Cossus ligniperda* amounted to as many as 4000; of which 288 were in the head, 1647 in the body, and 2186 around the intestines, so that if a *Lithocolletis* larva has anything like the same number the size of each is utterly beyond our conception.

Truly the microscopic study of insects and their structure furnishes a wide field for investigation, and a vast deal yet remains to be learned respecting the comparative anatomy of this portion of creation. I cannot forbear once more urging my entomological readers to devote some of their winter evenings to this work. To dissect an insect requires, I am well aware, an infinite amount of patience, yet almost any species will well repay the trouble bestowed upon it.

Insects may be rendered sufficiently transparent to permit of the internal parts being microscopically examined, by soaking them in liquor potassæ for about a fortnight, and subsequently in alcohol, then in ether, and lastly in turpentine. The details of the process, by which entire insects may be made beautifully transparent so that they may be mounted in balsam without pressure, were given in a recent number of "The Journal of Microscopy," and to this I refer such of my readers as desire information on the subject.

How wonderfully complicated the structure of the well known cockroach is, the illustrated articles on the subject which appeared in last year's "Science Gossip" abundantly show, and those who desire to study insect anatomy cannot do better than take them as a guide. But I must not enlarge further on this theme, so with this recommendation to my young entomological to work a little with the microscope on winter evenings, I bring to a close these papers on THE ENTOMOLOGICAL YEAR.

Cambridge.

CAPTURES OF COLEOPTERA AT BATH, DURING THE RECENT SEASON.

By ROBERT GILLO.

(Concluded from page 259.)

May 29th.—Returned home. On the following day examined the baits and found several *Necrophorus vespillo*, two specimens of which on being captured made a singing noise; I had never before heard a beetle make this noise, and what astonished me most was its loudness. On examination, I could clearly see how the insect caused it. June 1st.—Under stones on Lansdown I took two *Cyghrus rostratus*, and in a ploughed field *Amara ovata* was abundant under clods of earth. By sweeping hedges I took *Xylocleptes bispinus* freely, and several *Priobium castaneum*. Under dung, on the Midford sand, I dug out three *Copris lunaris*, a species I had never before noticed in this district although I had taken it freely at Bournemouth. June 2nd.—Excursion to the Forest of Dean with the Bath Microscopical Society. As I had not my collecting apparatus with me I could not do much work, but I noticed under stones *Pterostichus oblongopunctatus* in plenty, as well as all the common Geodephaga. *Cicindela campestris* was flying about, and *Silpha quadripunctata*, *Dolopius marginatus* and others I knocked out of the oaks. I determined to go again better equipped. June 6th.—In Hampton Wood I took *Trechus micros* and *Bembidium brunnipes*. June 9th.—By sweeping in lanes I took *Micropeplus porcatus*, *Polyopsia præusta*, *Grammoptera ruficornis*, *Rhinosimus viridicollis*, *Xylocleptes bispinus*, and *Priobium castaneum*. Went again to the Forest of Dean. It was an intensely hot day, and beating the hawthorn bushes still in bloom produced the following results: *Otiorynchus picipes*, *Strophosomus coryli*, *Polydrosus pterygomalis*, *Anaspis melanopa*, &c., in profusion; *Dolopius marginatus*, *Telephorus alpinus*, *T. pellucidus*, *T. nigricans*, and *T. lituratus*, came down also in some numbers; the remaining captures being *Silpha 4-punctata* (4), *Liopus nebulosus* (3), *Cychramus luteus* (4), and *Malachius bipustulatus*, *Grammoptera ruficornis*, *Campylus linearis* and *Necrophorus mortuorum*, one specimen of each. These together with other things resulted in a very satisfactory day's work. June 18th.—In a field on the Midford sand I found *Tachypus flavipes*, *Amara plebeia* and *Phionthus varius* in abundance. I took one *Lebia chlorocephala*, and although I looked repeatedly for it I never saw another. There is no broom growing anywhere within miles that I am aware of. At this place I have frequently taken *Notiophilus biguttatus*, *palustris*, and *substriatus*, but never *aquaticus*, which I have only found as yet at

Clevedon. By sweeping I obtained *Crepidodera transversa* and *ferruginea*, *Liodes glabra*, *Cassida viridis*, *Cistela murina*, *Lagria hirta*, *Helodes minuta*, and *Helophorus rugosus*; this last species I never find in water like the rest of the *Helophori*. June 30th.—By sweeping I took *Telephorus flavilabris* in numbers, but only in one spot about three or four yards in extent. Although I examined carefully I am unable to suggest any reason for this as there did not appear to be any peculiarity either of soil or vegetation. I took also *Athous niger*, *Priobium castaneum*, *Malachius bipustulatus*, and plenty of *Oedemera lurida*. Finding a *Sinodendron cylindricum* suggested to me that I ought to look for it in the old ash trees. I did so, and found several *Dorcas parallelopipedus* but no *Sinodendron*. I noticed *Crepidodera aurata* in great abundance on the willows by the river. July 6.—Went again to the Forest of Dean. Beating produced *Athous niger*, *hæmorrhoidalis* and *vittatus*; *Corymbites quercus* and *Holosericeus*, *Dascillus cervinus*, *Hoplia philanthus*, several *Liopus nebulosus*, and other species before mentioned in plenty. I noticed that the leaves of the Spanish chesnut trees were cut and screwed up in a peculiar manner, and I was not long in discovering the cause, for with a little attention and watching I found the insect flying about the trees; it proved to be *Attelabus curculionoides*. I also took *Strangalia armata*, and picked up one *Geotrupes sylvaticus* just as I was leaving. This species was new to me as in my district I have only found *spinger*, *stercovarius* and *mutator*, and *Typhacus* at Bournemouth only. July 10th.—I took *Taphria nivalis*, and noticed *Aphodius foetens* and *rufipes* in dung. Sweeping produced *Athous longicollis* freely, also *Hypera nigrirostris* and *Agriotes pallidulus*. On nut bushes any quantity of *Adrastes limbatus* could be obtained, and on thistles *Telephorus fulvus* was a perfect pest. July 20th.—Took *Olisthopus rotundatus*, *Cryptocephalus minutus*, *Anthicus floralis*, and six *Chlanius vestitus* altogether in a ditch. This last species seems common here in very damp places. July 25th.—I tried the mill pond at Bitton Paper Mill *Haliphus ruficollis* came up in the net by the hundred, *H. fulvus* was not so numerous, and *H. obliquus* one specimen only. *Hydroporus inæqualis*, *pictus*, *palustris* and *depressus* were freely represented, also *Agabus maculatus*, *Laccophilus hyalinus* and *minutus*, and, of course, *Gyrinus natator*. Aug. 10.—A day's excursion to Burnham. On the "sand tots" *Coccinella 11-punctata* was very numerous, as well as *Calathus mollis*. I only noticed two *Cicindela maritima*, perhaps owing to its being so windy, for the two I caught seemed to have had the life blown out of them. Between the "tots" there is a low-lying piece of land, usually a pond or bog overgrown with iris, mint, &c., but on this occasion, owing to the very dry season, it was firm enough to enable me to walk over it. This spot proved a very good one for

sport, for I took here in the short time I had at my disposal: *Dyschirius globosus* (6), *Cassida equestris* (22), *Chrysomela polita* (10), *Lagria hirta* (2), *Ctenopus sulphureus* (2), *Prasocuris phellandrii*, *Anomala Frischii*, *Hypera punctata*, &c. I found a pond close by, but as I had only fifteen minutes to spare I did not get much, only *Agabus bipusulatus*, *Colymbetes fuscus* and *Hydroporus lineatus*. A boy who lived near told me that he had often caught with his hand a beetle that made a noise, and from his description I knew it to be *Pelobius Hermanni*, but I was not fortunate enough to catch one. The Aphodiidæ to be seen in dung were *scybalarius*, *fimetarius*, *foeteus*, *rufescens*, and *rufipes*. Aug. 15th.—I took *Carabus monilis* and *nemoralis*; This was the first time I had met with either of these species in this district, although *C. violaceus* is tolerably common and *C. catenulatus* more so. I found *Harpalus azurcus* abundantly, and of *rupicola*, one specimen; also *Taphria nivalis*. I placed some fish refuse as baits for *Silphidæ*, &c. Aug. 24th.—A day's excursion to Clevedon. A scorching hot day and beetles were not abundant. I found *Dichrotrichus pubescens* and *Pogonus chalceus* in some quantity, but *Philonthus fuscicola* I could not find, although I have met with it here under seaweed in profusion. *Xantholinus tricolor* also occurs here freely, but on this occasion I only found one. *Ocypus ater* is common under stones and debris on the beach, and the specimens are usually very large. Aug. 28th.—I examined baits, the result being *Necrophorus humator* (2), *interruptus* (2), *ruspator* (4), *vespillo* (11), *Silpha rugosa* (1), and a lot of *Philonthus æneus*, *Choleva*, &c. Aug. 31.—A day's excursion to the Forest of Dean. Unfortunately, it turned out wet, and collecting was miserable work. *Pterostichus oblongopunctatus* and *Anchomenus junceus* were very common, also *Patrobus excavatus*. I took *Cychrus rostratus* and *Philonthus puella*. I dug out a good many *Geotrupes* from under dung, hoping to find *sylvaticus*, but they all turned out to be *spiniger* and *stercorarius*. The Aphodiidæ were *rufipes*, and a few *fimetarius* and *depressus*.

I have noted most of those that seem important to me, though doubtless, many are common and not worth mentioning, but I do think that it is only by recording captures in various localities, and noting the date and conditions—geological, botanical, or otherwise—under which they were found, that anything like a clue to the distribution of beetles will ever be obtained. In conclusion, I should like to impress upon all novices (one of whom I consider myself) the importance of keeping an extensive diary, and writing down everything. I feel sure that a good deal is not recorded because it is not thought worth making a note of it at the time, which in after years would be most useful.

NOTES ON LEPIDOPTERA

TAKEN BY E. R. CURZON, ESQ., AT THE ISLAND OF HOY, ONE OF THE
ORKNEY ISLES, DURING THE SUMMER OF 1885.

By C. S. GREGSON.

In the "Entomologist," Vol. 15, for January, 1882, pages 1, 2, 3, 4 and 5, is a most interesting and instructive paper upon the Lepidoptera taken by Mr. Meek's collector during four months summer collecting in Hoy, and if the readers of the "Young Naturalist" will refer to that very valuable paper it will save me much time and some repetition, and it will be seen that though Mr. Curzon did not take several species which Mr. Meek's collector did, Mr. Curzon took several other species that he did not take, thus adding materially to our knowledge of the lepidoptera of Hoy. Mr. Curzon brought the whole of his captures here, and we had ample time to examine them for the next few days, and that peculiarities might be noted he placed his duplicates most generously at my disposal, and I having availed myself of his kindness, can now refer to and make notes from some of the specimens, as I draw out the list of his captures at Hoy for 1885.

Pieris brassicae.—Plentiful. Very large and well-marked specimens.

Chortobus davus.—Average size. Many specimens without ringlets, some on which one or two small ringlets can be found, with a gloss here and there. Upper sides light green colour edged with whitish grey. Under sides upper wings greyish green, with a fawn coloured disk, across which is a faint perpendicular long lightish mark. Under wings greyish green, some specimens have a triangular mark above the middle, and a very faint line from it to the upper margin, below no indication of a band. Variety *Orchade*?

Lycæna alexis.—Very large and rich coloured, the males are such as I have never seen either Foreign or British; the females are also very large and highly coloured. They are mostly of the variety *Simplonia* of our Swiss friends. I have English specimens of this named variety, but they are not nearly so large, nor are the white rays near the tips of the wings so well developed as they are in these Hoy specimens.

Arctia fuliginosa.—Fine. The darkest specimens I ever saw, not a particle of red upon them.

Hepialis humuli.—Large specimens, but no rarity amongst them.

H. velleda.—Small light-coloured specimens.

Chelonia plantaginis.—No peculiarity.

Scotosia belgiaria.—Very light.

Fidonia atomaria.—Variable as it always is.

Larentia didymata.—Large. Males dark, females almost white, often with a broad central dark band.

Larentia cæsiata.—Small specimens light and various.

L. pectinaria.—Small.

Emmelesia albulata, affinnitata, blandiata.—No varieties taken.

Eupithecia venosata.—Yet in pupa.

E. satyrata.—All these are typical of variety *Calunaria*, Stainton, as per specimens in my collection given to me by Mr. Stainton years ago.

E. nanata.—No variety!

E. sobrinata.—A very long series bred. They vary from the light variety *ultima* of Duponchel, H.S. to rich dark, I was going to say black, but black is such an uncommon colour in nature that I won't.

Thera simulata.—A few bred; no variation.

Ypsipetes ruberata.—Beautiful red varieties.

Y. elutata.—The most wonderful series of varieties I ever saw from one locality. They are simply magnificent, but no greens amongst them. Mostly variations of reds and browns or of ochres running to nearly black.

Melanthea ocellata and *alchemillata*.—No peculiarity.

M. montanata.—Large, various, some nearly white, splendid varieties.

Coremia munitata.—No peculiarity.

C. fluctuata.—Exceeding variable as it is everywhere.

Cidaria miata.—No peculiarity.

C. russata.—Dark specimens, having a few light—shall I say bright—markings intermixed.

C. immanata.—Dark, not large and little variation.

C. testata.—Ordinary specimens.

C. populata.—Small. From light ochre to rich dark brown specimens, without markings.

C. fulvata.—Typical.

Anaites plagiata.—Rather small.

H. micacea.—Large and finely marked.

H. graminis.—Nothing striking, but inclined to variety *Hybernicus*.

Xylophasia rurea.—Typical, and variety *combusta*.

X. polyodon.—From light specimens to rich dark brown (intermediate varieties).

Mamestra furva.—I never knew this species to vary anywhere.

Apamea basilinea.—Fine light specimens.

A. gemina.—This generally variable insect assumes another phase of variation at Hoy; it is there a light greyish insect as illustrated by Mr. Curzon's captures.

- O. oculo.*—Varies as it does elsewhere.
- Miana furuncula.*—No peculiarity.
- Caradrina cubicularis.*—Normal. I never saw but one variety of this species, it was given to me by my friend H. Doubleday, and is highly prized by me.
- Agrotis suffusa.*—Large, rich coloured, and common.
- A. obelisca.*—Small.
- A. agathina.*—Small, light.
- A. porphyrea.*—Normal.
- A. exclamationis.*—Very fine (extraordinary).
- Triphæna pronuba.*—Every shade of colour from dark to light.
- Noctua glariosa.*—Medium, say rich coloured.
- N. augur, N. plecta, N. c-nigrum.*—Usual style.
- N. brunnea.*—Very small. Rich dark coloured.
- N. festiva.*—Small, but every conceivable colour from the light peach-blossomed variety *conflua* to rich dark red browns, sometimes striated, often self-coloured.
- N. Dahlii* ?—If not the preceding requires further examination!
- N. xanthographa.*—Fine.
- Teniocampa rubricosa.*—Variable in colour, always light greys. It appears to have lost its rich ruddy colour at Hoy.
- Epunda lutulenta* var. *lunenburgensis.*—Ground almost black, with light silvery edging to central striga. Never saw any so fine before.
- E. viminalis.*—Large. Bright silvery ground with well-pronounced markings!
- Hadena adusta.*—Rather dark. *H. glauca.*—Ordinary size and colour.
- H. dentina.*—Usual forms
- H. oleracea.*—Like *rubricosa* this appears to have lost its ruddiness at Hoy, and appears in light greys of various shades.
- H. thalassina.*—Light and beautiful.
- Habrostola urticae, Plusia gamma, P. v-aureum, Stilbia anomala, Herbula cespitalis.*—The usual forms.
- Scopula lutealis* and *prunalis.*—Rather small.
- Stenopteryx hybridalis.*—Usual form.
- Scoparia atomalis* and *augustalis.* Rather light; fine.
- Crambus pratellus.*—Ordinary specimen. *C. ericellus.*—Large and well-marked. *C. culmellus.*—Usual forms.
- Peronia caledoniella.*—Ordinary specimen. *P. variegana.*—Do., little variation.
- P. hastiana.*—Does not vary much. Variety *combustana* being the only pronounced variety bred, all else are darkish or dark.

P. mixtana.—Variable as it is everywhere.

Amphysa Walkerana.—No variety.

Teras caudana.—All the specimens are referable to variety *affractana*, dull coloured and slightly notched.

Dictyopteryx Bergmaniana.—No peculiarity.

Penthina marginana.—Small specimens.

Pardia tripunctana and *Mixodia schulziana*.—Fine.

Orthotæna antiquana.—Plentiful and fine, but colourless.

Eriopsela fractifasciana.—Fine.

Cnephasia musculana.—Ordinary specimens at Unst; in Shetland this assumes quite a new form!

Clepsis rusticana, *Bactria lanceolana*, *Phoxopteryx unquicana*, *Grapholita compolitana*.—No variation.

Hypermecia augustana—*cruciana*, Lin.—Fine, red.

Ephippiphora scutulana.—Usual form.

Pædisca solandriana and *P. sordidana*.—Usual form, no noticeable varieties.

Coccox finetinana—*tædana*, Lin.—Bred freely, see "Young Naturalist," October, 1885, page 237.

Pamplusia monticulana.—Normal.

Dichrorampha herbana?—Large.

Catoptria ulicetana.—Beautiful. They are all the var. *anectana*, Steph.

C. scopoliana, *Xylopora Fabriciana*, *Eupicelia ruficilliana*, *Argyrolepis Baumanniana*, *A. nicana*, *Tinea rusticella*, *Incurvaria Sohlmaniella*, *Depressaria costosa*, *D. applanata*, *D. chaerophyllivorella*, *Gelechia terrella*, *G. proximella*.—Normal.

G. instabilella, *Plutella annuletella*, *Swammerdamia griseocapatella*, *S. bicostella*, *Argyresthia pygmæella*, *Coleophora anatipenella*.—Fine.

Pterophorus bipunctydactylus and *trigonodactylus*.—Grey.

One species which fed in the seed pods of *Lotus corniculatus* now in pupæ. The *Tinea* do not vary in any way.

In my observations on the specimens taken, I have judged them by fair average English specimens. It may be observed by comparing the list given by our friend Mr. Jenner Weir, in the "Entomologist" Vol. 15, pages 1, 2, 3, with this list, that Mr. Meek's collector took about 25 species of Macro-Lepidoptera which Mr. Curson never saw in Hoy, and that Mr. Curzon took a little over that number of species of Micros not recorded in that list. In the absence of any published account of the *Tinienæ* taken in 1881, the present list must be taken as the first instalment of the *Tinea* of Hoy, and these 18 species added to his 28 species of Macros recorded makes 46 species

added to the list. It must always be a pleasure to the amateur entomologists to increase the known fauna of a district, but there are few men who can and fewer who will isolate themselves from the world in a far off island for a whole summer, where the wants of civilized life cannot well be supplied. And we who stop at home at ease or at most run off by cheap excursion trips once a year, look very small on our return, and we owe to such men a deep debt of gratitude not only for their self-sacrifice, but for the liberality they invariably shew to their less energetic or less fortunate friends.

With these two lists before us if we carefully read over Mr. Weir's observations, I think we may fairly draw very different conclusions as to the causes of variation in lepidoptera to any given by Lord Walsingham in his careful and interesting address to the "Yorkshire Naturalists' Union," at Doncaster, 1885, a copy of which has recently been lent to me by my friend Dr. Ellis. Many years ago a very facile writer but empirical entomologist exhibited a box of dark varieties of lepidoptera at a meeting of the "Northern Entomological Society," observing that northern insects tended to melanism. It was asked by a practical member where did his North begin, and this rather posed him, but to illustrate North and South a member brought *blacker darker* specimens taken in Cheshire and Staffordshire (south of the meeting), than any he exhibited, except only *oculta*, and we heard no more of geographical variation, it being generally conceded at that meeting that in so small, so temperate, and so central a latitude as from 50° to 60°, little variation could be expected geographically, but that geologically every variation might be hoped for. Here we have in the observations on the Hoy insects much that goes to show variation is far more the result of the geology of the district than of isolation, climatic conditions, &c.; but his Lordship successfully clears the last assumption away as he does others most logically. I confess I was surprised when I read at page 21 that the smoke of our furnaces and our chimneys *had* given us dark *Amphydasis betularia*, black varieties of *grossulariata*, *chi*, *suffusa*, and dark *Tephrosia crepuscularia* and *biundularia*, because the first and second black *betularia* taken were found at rest upon trees in Cheshire where there is no smoke, and the blackest *grossulariata* I breed are taken on Pen-y-guriawin (the white mountain) in Wales, and the darkest *biundularia* and *repandaria*. &c., I ever see are taken at Delemere Forest, 12 miles from any smoke of moment, and at Burnt Wood (Staffordshire), many miles away from the potteries and the iron-works of that county. It is not my province to combat Lord Walsingham's paper, but I think it quite within our right to suggest to our theorists that they are off the line, and to point out as practical workers that as in the case of Hoy lepidoptera (they are bred on old red sandstone formation, and here we are

upon the new red) so Hoy insects do not differ much from ours, or the insects of the adjacent lands, or the other islands. The Outer Hebrides and Shetland are not old red, so having fed for ages upon plants which have drawn their sustenance from a different composition the insects differ. The first illustration that occurs to me is *Dianthæcia carpophaga*, fed on *Silene maritima*, growing on the shore amongst the shingle, from Clontarf nearly to Dolly Mount, Ireland, produced me very dark specimens, but with a decided ochreous tendency; whilst larvæ collected the same day, feeding on the same food-plant which grew on quarteze and early rocks, produced me rich dark variety *Capsophila* without a trace of ochre upon them, and some bred from plants growing amongst igneous rocks at Scarlet, Isle of Man, produced variety *capsophila* with a beautiful purple blush over the dark ground. Again *Acidalia contiguaria*, captured in Wales, feeding on low plants, as light coloured when bred as it is figured in "Entomologists' Annual," for 1856, under the name of *Deburnata*. Specimens bred upon growing plants of *Calluna vulgaris*, carted from Risby Moss by an old friend (Noah Greening) year after year became dark smoky insects, every specimen being fumose varieties. Risby Moss is far away from any smoke, and the food was always washed and kept under cover, and each year they became perceptibly darker. It is such experiences as these that induces me to say—Read all that is said on the subject of the probable causes of a tendency to variation in any latitude but use your own judgment if your friends get off the line. I must confess I know little of the insects of high latitudes, Britain does not extend to 61° north, and I hardly call 60° north, high. If I were attempting to controvert Lord Walsingham's paper (which I am not) I should in justice have to argue the various points, I have no desire to do so, but I think it well to remind our young friends that it is quite new to me to hear "*Gnophos obscurata* assumes the colour of the soil or the objects which surround it." At Llanverris, in Wales, it is a most abundant insect, occurring all over the district as a red coloured insect on emergence; exposed to the sun as it often is on the rock faces near the Loggerheads, it is very soon a faded light drab, no blue lead colour is left, yet a blue lead coloured lichen grows on these rocks, and we are told it is because of it the insect has assumed this colour, &c., forgetting that all through the district they assume the same colour, though there are no rocks exposed, or blue lichen for them to copy for miles around. Again, at Bidston Hill in Cheshire this species is a very black insect; this range of hills are white sandstone covered by ordinary heath plants. I have read his Lordship's carefully prepared paper with much interest, but I am not yet convinced that what is called a tendency to melanism is explained by supposing the dull days of Northern latitudes, or the dull

days on mountains, or the dull days from smoke affects them. Again, there is no such variety known as "the black variety of *Abraxes grossulariata* from Lancashire." This county is a rather poor breeding ground, especially for *grossulariata*; and it is quite new to me to hear that *Tephrosia crepuscularia* occurs in any colour at Barnsley; that some Lancashire entomologists have bred or otherwise obtained (how and where they could) extensive series of varieties of *grossulariata* and other varieties is patent to all, but the so-called black *grossulariata* (var. *Varleyata*) are exclusively *Yorkshire*, whilst all the dark smoky varieties of *T. crepuscularia* (H.D.Cat.) come from the edge of South Wales. Here again geology not geography appears to have played its part—in other words the decompositions which supplied the sustenance to the food-plant of the insects, taken in conjunction with my practical knowledge of the effects of different foods upon the colouration of lepidoptera, lead me to the conclusion that it is to geological causes we must apply for the solution of melanic variation.

THE "YOUNG NATURALIST" LIST OF BRITISH LEPIDOPTERA.

By JOHN E. ROBSON.

The claim made by Mr. T. P. Newman of copyright in "Doubleday's Synonymic List," caused the suspension of that commenced in these pages, which was asserted to infringe that copyright. I need not say that had I known such a claim would be made, I would never have commenced the list in that form. Having commenced it, I would have been glad to carry it through, could I have made a satisfactory arrangement to do so. The terms proposed by Mr. Newman were such as I could not think of accepting, and as it was not worth a law suit, I was reluctantly compelled to abandon the idea of completing it. So many of the readers of the *Young Naturalist*, regretting the enforced abandonment of my former design, have urged me to undertake a new list, that I have decided to do so, though with considerable reluctance. I felt, and still feel, that such a work ought to be undertaken by the "Entomological Society," or by a Council of British and Foreign Lepidopterists, of sufficient authority to have their arrangement received with confidence, and whose decision as to nomenclature would be accepted as final. To me it seems the height of absurdity that the name of an insect, given in a work of authority, and that has been in universal use perhaps for a century, should be superseded by another name, given by some obscure author, who

perhaps published a descriptive list of the lepidoptera of some unknown village, and whose work no one has seen. It is quite time we had a settled nomenclature. The constant changes of name that are being made by compilers of catalogues, on the authority of the absurd law of priority, are making the writings of even a few years ago, quite a sealed book to those now entering upon the study, or worse even than that, by names being used for one species now that were formerly used for another, the young naturalist may be led entirely astray.

In the catalogue I propose to commence in the part for January, 1886, I will give priority to the names British lepidopterists are accustomed to use. Those to which priority is given in the catalogues of Drs. Staudinger and Wocke, Mr. W. F. Kirby and others, will be added below, and the dates affixed to each, so that students will understand what species is intended when these names are met with. Varieties will be given in the same way as in the former list, and a few words will generally be added discriminating between the type and the variety. This, I hope, will prove a useful addition.

In preparing the catalogue and passing it through the press, in addition to the assistance of those whose names appear on the title page, my friend Mr. John Gardner will render special aid. His intimate knowledge of the earlier stages of most of our Macro-lepidoptera will, I trust, be of considerable service in any alterations of arrangement it may be necessary to make.

In the sequence of groups and genera, the arrangement of MM. Boisduval and Guenee is mainly followed. This differs considerably from any hitherto offered to British collectors, but will, I think, be found the most natural lineal arrangement yet proposed. Those to whom it has been submitted have expressed their approval, and the "Haggerston Entomological Society," after a careful examination of the MS., have cordially agreed to accept the Dedication of the Catalogue.

THE POSTAL EXCHANGE CLUB.

This Club was successfully carried on last year, but the exhaustion of the duplicates of many of the members led to its temporary suspension during the winter. For some reason or other with which I am unacquainted it has never been recommenced. The second club which resulted from the success of the first, was commenced, but after a few rounds the box ceased to travel, and numberless enquiries were directed to me as to the reason for its non-arrival. It has now turned up and is in my possession. I have also had a set of new boxes made for club No. 1., and purpose to send both on their

rounds again. Will those old members who desire to continue their connection with it, kindly communicate with me, as Mr. Carter is desirous to give up the office of Secretary. If there are any who would like to join the clubs I would be glad to hear from them early. The object of the club is to facilitate the exchange of specimens of insects in any order, and the *modus operandi* is as follows. Each club is limited to ten members. A box, containing ten smaller ones is sent from member to member by parcel post, and is expected to make the round once a month. Each member fills his box with such species as he can supply, and takes from the others whatever he may want. No limit is placed on what may be taken, but each member is expected to do his best for all. Except of rarities, only good specimens are permitted to be sent. Insects in any order may be placed in the boxes to be named and returned. Lists and a note book circulate with the boxes. A small levy not exceeding 6d. each member may be made to defray expenses when needed. The first boxes were given by Mr. Moseley, and I give the second lot, so that no entrance fee is needed. Early communication from those who desire to continue or become members is requested. All to be addressed—JOHN E. ROBSON, 15, Northgate, Hartlepool.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meetings during November were chiefly devoted to objects of interest to members only, though a very lively discussion was held on the life history of *V. io*, the subject being introduced by Mr. Cripps.

The Annual Pocket-box Exhibition of this Society, which was held on Thursday, November 12th, was very successful, a large number of members and visitors being present. The exhibits were fairly numerous and interesting. Among others may be mentioned five magnificent *S. convolvuli*, and a very perfect specimen of *C. celerio* from Lynmouth (Devonshire), exhibited by Mr. Thornwaite, who also showed many other species including *F. conspicuata*, *C. sagitata*, *B. asinalis*, *L. testudo*, *L. asellus* and *S. versicolor*. Mr. H. Jobson's box contained two fine *P. orichalcea*, and a series each of *E. venustula*, *B. argentula*, *A. sulphuralis* and *E. stachydalis*. No less than three boxes full of *A. alni* were shown by Mr. E. Cooke, who also brought some varieties of *C. villica* having the spots on the anterior wings confluent, and a nice series of *E. curvistrigana*. Mr. Franklin, in addition to rows of bred *P. hamula* and *S. dubitata*, exhibited the life histories of

several species ; but the best exhibit of this kind was Mr. Pearson's case containing 12 species, all most carefully worked out and arranged, including the ichneumons in many cases. Mr. Anderson also showed two boxes containing preserved larvæ, and Mr. Tufnell had a box with a careful selection both of imagines and larvæ. Perhaps the most recently captured specimens in the room were a series of *H. pennaria*, placed by the side of some *S. lithargyria*, both lots being brought by Mr. Gray from Red-hill ; while close by Mr. Russell's box at once arrested attention with a fine "IVI" variety of *S. irrorella*, a peculiar sandy yellow form of *M. fluctuata*, and fine bred series each of *E. autumnaria*, *A. tridens*, *T. fimbria*, *T. orbona*, and others. Mr. Hockett confined himself to one species, shewing a graduated series of varieties of *A. grossulariata* ; and Mr. Harper's box contained varieties of *A. lubricepeda* and *E. angularia*, and specimens of *A. leporina*, *D. orion*, *O. cænosa*, *C. viduaria*, &c. Mr. J. A. Clark had a specimen of *C. celerio*, captured in Hackney ; also varieties of the female *L. corydon*, and a living specimen of *A. atropos*, while Mr. J. A. Cooper's rows of bred *E. orbicularia*, *E. porata*, and *P. syringaria*, were deservedly much admired. Of course, varieties of *A. caja* were present, some light and dwarf specimens being shewn by Mr. Gates, though none of them could compare with the beautiful dark suffused specimen shewn by Mr. Gurney. Among other exhibits by members were Mr. Allbury's confluent varieties of *C. villica*, *S. dealbata*, *E. ochroleuca*, *P. rhododactylus*, and specimens of *L. dispar* taken this year at Baxley Heath. Dr. Sequeira's selection from his Devonshire captures, including some splendid forms of *Y. elutata*, *C. picata*, *C. prunata*, *C. siliceata*, &c. Also a very fine show of Coleoptera, comprising specimens of *Rhynchites pubescens*, and many species of *Coccinellidæ* by Mr. Pearson ; while Mr. Cripps exhibited several species of the genus *Donacia*, including *D. menyanthidis* and *D. Typhæ*, also a female of *Athous longicollis*, four species of *Coccinellidæ*, *Plagioderma armoraciæ*, *Pterostichus lepidus*, &c. ; and Mr. G. A. Lewcock exhibited *Necrophori*, *Donaciæ*, four excellent examples of *Saperda carcharias*, *Grammoptera tabaccicolor*, *Leptura livida*, *Gymnetron*, *Sibynes*, *Hypera*, *Tanymecus*, *Cleonus nebulosus*, *Bembidii*, &c., all remarkable for their careful mounting and neatness of arrangement. The visitors also made considerable additions to the exhibits, in fact the centre of interest throughout the evening was Mr. B. W. Neave's very beautiful variety of the underside of a male *L. alexis*, captured on Brighton Downs—this beautiful specimen, which certainly deserves figuring, has a series of long dashes most regularly arranged, in place of the usual markings. Mr. Hawes shewed a very nice male *A. paphia*, much streaked with black, and also types of the bleached form of *S. janira*, and Mr. J. Riches had a suffused speci-

men of *H. abruptaria* taken at Hornsey Rise. Mr. W. G. Pearce contributed specimens of *A. alni*, four *A. strigosa*, and one *S. ulvæ*, while very dark forms of *D. capsophila* were exhibited by Mr. Adkin, and fine rows of *N. rubi*, *X. scolopacina* and *X. rurea*, all shewing much variation, were shown by Mr. Southey. Mr. C. H. Williams had several very pretty forms of the common *O. dilutata*, and also a most peculiar melanic form of *P. syringaria*; while a book containing a large number of most excellent photographs of objects under the microscope, most kindly sent up by Mr. Gills, of Bath, added materially to the interest of the proceedings. Mr. Rolfe also exhibited some specimens, which however, I must decline to notice.

An expedition also took place on Nov. 16th to Epping Forest, when most of the usual species were observed, though hardly so numerous as they are generally; it was also noted that the size both of *H. aurantiaria* and *H. defoliaria* seemed considerably below what it should be.

ERNEST ANDERSON, Secretary.

OUR LONDON LETTER.

There is little to record at the present time. *O. dilutata* has been very abundant, and *H. aurantiaria*, *H. defoliaria*, and *H. pennaria* are all to be taken now in the various woods round London. The specimens, however, do not appear to be up to the average size, some of the *aurantiaria* more particularly being exceptionally small. The Haggerston Society have just had their annual exhibition, and the South London hold theirs on December 3rd, and by all accounts it promises to be fully up to the average. A fungus foray was made over Epping Forest a few days since by members of the Hackney Microscopical Society, with very great success, the recent wet weather having been highly favourable to those who pursue this branch of Natural History. Unless anything of interest happens I shall now take leave of the readers of the Y.N. until the return of spring once more gives me something to chronicle.

London, 20th November.

COLEOPTERA

FOR

BEGINNERS.

INTRODUCTION.

THE term COLEOPTERA is applied to that order of insects which includes the beetles, and is derived from two Greek words signifying "sheath-winged," from the character of the organs of flight in the great majority of these insects. The wings, as in many other insects, the butterflies and moths, bees, dragon-flies, for instance, are four in number; but while the two hinder ones only are fitted for aerial locomotion, the two anterior or front ones are converted into horny or leathery sheaths, which, meeting down the middle of the back in a *straight* seam (known as the suture) serve to protect the true wings, which are beautifully folded and packed away beneath them. The fact of the two *elytra* (each of these wing-cases is known as an *elytron*, plural *elytra*), meeting in a straight suture is emphasised, because this is a point in the structure of beetles that separates them from other insects which resemble them in having horny wing-covers, the cock-roaches and crickets (order *Orthoptera*), the ear-wigs (order *Dermaptera*), and the plant and water bugs (order *Hemiptera*), in all of which the wing-cases overlap through a greater or less extent of their inner margins. In a very few instances the elytra of beetles slightly overlap, as in the oil-beetles (genus *Melœ*); in a few the female sex is nearly or quite destitute of either elytra or true wings, the female glow-worm (*Lampyrus noctiluca*) being a notable example; in a very much larger number the true wings are quite absent or rudimentary, and the two elytra are often, in these cases, soldered together at the suture. This apterous (wingless) condition is characteristic of many large genera, such as the *Carabi* and *Calathi* among the predacious land beetles; and it is often

remarkable that while in certain groups of beetles those species which inhabit places near the sea level are perfectly winged, their near relations which live at high elevations on mountains are frequently furnished with very rudimentary true wings or with none at all.

The COLEOPTERA are also distinguished from the two orders most nearly related to them in appearance, the *Orthoptera* and *Dermaptera*, by the fact of their having, before they acquire their perfect (or imago) state, a well defined stage of quiescence—the pupa state, analagous with the same condition in butterflies and moths—in which the perfect insect is soft and yellowish-white, plainly seen through the folds of a thin investing membrane which holds the various limbs closely pressed against the body, and in which stage the only motion of which the insect is capable is of a wriggling character, caused by the movement upon each other of the abdominal segments. Among the crickets, cockroaches, earwigs, and bugs—which latter differ from the beetles in having a mouth furnished with a proboscis through which they suck the juices of the plants and animals upon which they feed—there is no distinct stage of pupa-hood, but the whole time between the emergence of the larva from the egg and the period when the perfect form is reached is one of continual evolution, the wings and other organs distinctive of the imagal condition, being gradually added during a period of activity, in which the transitions from larva to pupa and from pupa to imago are not or scarcely marked.

Some knowledge of the external anatomy of beetles is absolutely necessary to one who desires to name the specimens he adds to his collection, and a brief outline of the structure of the principal parts of the perfect insect is here given, for the correct understanding of which, however, one of the larger ground beetles or a large water beetle should be dissected and compared, part by part, with those mentioned. Take, for example, a specimen of *Carabus violaceus* or *Pterostichus niger*, both common ground beetles, and with the aid of a lens the following structure will be easily made out.

The body is composed of three parts, viz. head, thorax, and abdomen.

The head, which is often narrowed behind into a neck, carries on each side a pair of large compound eyes, each of which is sometimes divided by a process of the cheek into two portions, one upper and one lower, as in the whirlwig beetle (*Gyrinus natator*). Occasionally the head between the eyes, which portion is called the *vertex*, carries one or two simple eyes (*ocelli*). The portion in front of the vertex is the *forehead*; the extreme front of the forehead, often separated by a distinct joint or seam is called the *clypeus*. In the common Dor-beetle the clypeus is very distinct, and bears a well-defined tubercle. Springing from each side of the head in front of the eyes, or from

the corners of the forehead, are the two horns or *antennæ*, very variable in appearance in different groups. In all the ground beetles they taper gently from base (where they spring from the head) to apex, and are then called *filiform*; they are often of equal thickness from base to apex, and composed of joints from the resemblance of which to a string of beads the term *moniliform* has been applied to the antennæ, as seen in the meal-worm beetle (*Tenebrio molitor*); the terminal three or four joints are often so much larger that the antenna becomes clubbed (*clavate*), as in the burying beetles (*Necrophorus*). In the cockchafer (*Melolontha*), a peculiar modification of the club is seen. Here the terminal six or seven joints become flattened and hinged together by one edge so that the joints open out or shut together like the leaves of a book; such an antennæ is *lamellated*, and is typical of the Lamellicornes (Chafers, Dor-beetles, Aphodii, &c.); very often the basal joint of the antennæ is long, and the second joint is fastened not at the extreme end of the first but a little to one side, so as to give the antennæ a distinct bend at this point; such an antenna is *elbowed* and elbowed antennæ are nearly always clubbed as well, as in the weevils, where the long basal joint is known as the *scape*, and the portion intervening between the scape and the club is called the *funiculus*. Among a few of the British beetles the joints of the antennæ are furnished with a long process or spike on the inside, so as to give the organ a comb-like or *pectinate* appearance, as seen in some of the skip-jack beetles (*Corymbites*.)

In front of the antennæ and beneath the clypeus we come to the organs of the mouth which are somewhat complicated in structure. Immediately beneath the clypeus, and often projecting beyond it, is the *labrum* or upper lip; and if the insect be turned on its back a similar structure will be seen to form a lower lip or *labium*, the principal portion of which is occupied by the *mentum* or chin, often notched in front, while springing from its front edge are a pair of small feelers (*labial palpi*) composed usually of four joints. In the interval between the labrum and labium lie two pairs of jaws, which work, not upwards or downwards as in most animals, but from side to side. These can be easily seen by pulling them apart with a strong pin, and the two pairs will be found to have a very different appearance. The upper pair, often very long and sharp-pointed, and often with teeth on the inside, are called the *mandibles*; the lower pair are called the *maxillæ*, and are very variable in form, but each maxilla always consists of several joints, one of which is usually fringed with hair at the margin for use as a brush, while attached to the outer edge is another palpus or feeler, the two constituting the *maxillary palpi*.

The thorax, when looked at from above, appears to consist of a single

piece but the true thorax consists of three rings: what appears to be the whole of the thorax from above being really the upper segment of the first ring. This first ring is called the *pro-thorax*, and attached to the lower portion of it are the first pair of legs. The upper portion, just referred to, and the portion usually meant when the thorax is spoken of, is very variable in shape; it has an anterior margin by which it is connected to the head, a posterior margin connecting it to the next segment; two side or lateral margins often thickened or notched; two anterior angles at the junction of the anterior and lateral margins; two posterior angles at the junction of the posterior and lateral margins (but these are often so rounded off that no angle is visible). The portion of the thorax by which it seems attached to the elytra, that is the posterior margin, is usually called the *base*; the front edge is the *apex*; and, consequently, the anterior and posterior angles are often known as the apical and basal angles respectively. The upper surface of the thorax is often furnished with a central channel, on each side of which is the *disc*, while near the basal angles are frequently distinct pits, the *basal foveæ*, often thickly punctured. The second ring or segment of the thorax (*meso-thorax*) carries below the second pair of legs, while attached to the upper portion of it, and therefore nearly covering it, are the anterior wings (*elytra*.) Just at the place where the suture of the elytra would join the groove between the thorax and elytra is usually to be seen a small shield-shaped surface, the *scutellum*, and this is the only uncovered portion of the second thoracic segment. The hind segment of the thorax (*meta-thorax*), is quite covered from view above where the true wings are attached, while the hinder pair of legs are attached to its lower margin.

The legs are always six in number, in three pairs, called respectively anterior, middle, and posterior. Each leg consists of four portions, viz.—a *coxa* or hip, usually forming a flat plate, by which it is attached to the underside of the thoracic segment; a *femur* or thigh, usually the thickest portion, and which bears near its place of junction with the *coxa* a small process called the *trochanter*; a *tibia* or shank attached to the extremity of the femur—the joint being called the *knee*; and a *tarsus* or foot, consisting typically of five joints, often hairy beneath, the terminal one being armed with a pair of claws. In the males of many species some of the tarsal joints become much widened, while in the male *Dytiscus* these widened joints form a circular plate, the surface of which is furnished with suckers.

The *elytra*, or wing-cases, next deserve mention. These may be smooth, covered with irregular punctures, marked with fine lines (*striae*) or grooves (*sulci*) usually running from the base (nearest the thorax) to the apex (the point behind). These striae may be smooth (*striate*), or in the striae there

may be punctures (*punctate striate*); or there may be rows of punctures without any striæ. The spaces between the striæ are called *interstices*, and these are often punctured, hairy, or raised into ridges. The angle where the base joins the lateral margin is the *shoulder* or *humeral angle*; the apex is often produced or prolonged, or toothed; or the elytra may be cut square off before coming to a point, when they are said to be *truncate*. There is often a very short stria running close to the scutellum, called the *scutellar stria*; while often the only distinct stria which exists is the one next to the suture, hence called the *sutural stria*. The portion of each elytron which lies between the suture and the lateral margin is the *disc*.

The remainder of the body, called the abdomen, consists of a number (five to eight) of rings, united by membrane which attaches the front border of one ring to the hind border of the one in front of it. These rings, which are to some extent capable of being "telescoped" within each other, consist each of an upper—or dorsal—and a lower—or ventral—segment, and the last often bears special appendages, especially among the BRACHELYTRA. When the elytra are just short enough to show the last or last two abdominal segments these are called respectively the *pygidium* and *pro-pygidium*, and in some groups, Hister, *e.g.*, the amount of punctuation of these segments is of importance in determining the species. While in the majority of beetles the whole of the abdomen (with the exception occasionally of the last or last two segments) is covered by the elytra, in the group known as the BRACHELYTRA the elytra are so short as to leave nearly the whole of the abdomen uncovered.

We next turn to the consideration of the habits of the beetle tribe, and these are nearly as various as the species themselves. Everywhere we turn we come across them, in town and country, crowded street, or shady lane. If we are studiously inclined, and are accustomed to read while walking even in the busy streets of a large city, we shall find beetle visitors, often very minute in size, but sometimes of scarce species, whose habit will be to settle on the book or newspaper we are reading. If we fix our attention on the causeway as we walk along we shall find, if the day be fine and the sun shining (especially if the time of the year be spring), that numbers of beetles are attracted by the whiteness of the pavement, and are sunning themselves there. Such species usually belong to the genus *Amara*, or to the group of the Brachelytra known as the *Staphylinidæ*. As a contrast to those just mentioned, some species live only in damp dark cellars—goblins who fear the light of day. Such are the meal-worm beetles (*Tenebrio*), the cellar beetles (*Blaps*), and the scarcer *Sphodrus leucophthalmus*. *Pristonychus terricola* (*subcyaneus*) has a predilection for coal cellars, a habit which, on account of

its blue-black lustre, one would scarcely expect, as the majority of dark-loving species are dull and of sombre colours. Other species live exclusively in wine cellars, feeding not upon the contents of the bottles but upon the corks, or upon the fungi often found in such localities. Then when we go into the country we find beetles everywhere (if we look for them). Scarcely a tree, shrub, or herb but has species attached to it; in the case of trees often feeding beneath or in the bark. And while the majority of British beetles are phytophagous (that is plant-feeding), many are carnivorous, regaling themselves without the slightest remorse upon their weaker relatives; while a large number are also feeders on animal and vegetable substances in a state of decomposition. A pickle-bottle, within which is placed a small piece of raw meat, buried up to its mouth under a bush, will in fine weather in a few days produce a plentiful supply of this group of beetles. Ponds, lakes, and rivers all contribute their quota to our beetle fauna, while a small number, but often of very scarce species, live in the nests of the various species of ants, and can only be found in such situations.

Before starting on a collecting expedition, when beetles are our quest, we must provide ourselves with a small quantity of apparatus, by means of which we may capture and bring home in safety whatever we may meet with. Every coleopterist has his own ideas of what is absolutely necessary, but so far as I am concerned I prefer the following:—

(1.) A wide-mouthed bottle capable of holding about four ounces (what is known as a one ounce quinine bottle will do very well), the mouth of which is closed with a well-fitting cork. A quill or tin tube of about the diameter of a penholder passes through the centre of the cork, projecting about an inch into the bottle and two inches outside. This tube is fitted with a not too tight wooden plug or stopper, which goes nearly the length of the tube and which is prevented from slipping into the tube by a larger head, by seizing which with the teeth and withdrawing the cork when one hand holds the bottle, and the other is engaged with a beetle, the “*facilis descensus Avernii*” of the beetle is insured. It is advisable to have a crumpled piece of white paper or calico inside the bottle, to allow of the smaller specimens hiding among its crevices from any of their relations who are inclined to be too personal in their attentions. For larger specimens (*Carabi*, *Pterostichi*) whose presence along with smaller ones would be very prejudicial to the good preservation of the latter, either separate pill boxes may be carried for each, or what I have lately found very useful during a day’s collecting on Snowdon when boxes were scarce. That is

(2.) A smaller bottle of similar shape closed with a plain cork and con-

taining a piece of rag soaked with benzoline, which kill the specimens very quickly and keeps them relaxed.

(3.) For the reception of any specimens which require special care, either from their scarcity or variation, I usually carry a small box into which is fitted by loops of elastic a number (a dozen or so) of very small vials, very difficult to obtain, unless you purchase them at a homœopathic chemist's.

(4.) An umbrella, which is usually of most service on a fine hot day, that service being to beat trees and bushes into. Umbrella nets are sold for this purpose, but a great disadvantage of these is that on a wet day one appears to be carrying an umbrella in its case for fear of getting it wet.

(5.) An iron ring net with a ferrule or other arrangement for facilitating its being attached to the end of a walking stick. The ring may be jointed so that when not in use it may be folded up and put into the pocket. I used to have my sweeping and water nets made with a broad hem round the top through which the ring would pass, but I found that the wear and tear of brushing herbage, &c, used to wear these through in a short time. I then adopted, and with perfect success, a plan suggested, I believe, by the Rev. W. W. Fowler, in the *Entomologist*, viz. that of having a number of brass curtain rings, about three-quarters of an inch in diameter, sewn round the edge of each net, and the ring passes through these with facility. The material of the two nets—both of which fit the same ring, and can be changed quickly if necessary—is strong grey calico for the sweeping net, and a strong but open “bunting” for the water net.

This, with the addition at times, of a strong but light chisel for ripping off bark is all the apparatus that is necessary, and armed with some or all of these we may turn our attention to the byeways and hedges nearest our homes. Beetles as said before are everywhere. Turn over all the stones you see lying by the roadside, especially if surrounded by grass, and while you may often see specimens scuttling away amidst the grass stalks below the stone, and quite as often mistake a worm that has quickly popped into a hole for a beetle, you must never omit to look on that portion of the stone which has been lying on the ground, for here very often better beetles will be found. Open your umbrella, and holding it under trees or hedges, give them a smart shake, or a slight threshing with a hedge stake, and among the *omnium gatherum* which tumble into the umbrella you will be certain to find that beetles have a place. Roadside herbage, especially cruciferous plants such as the common wild mustard (*Sisymbrium officinalis*), and nettles are usually very productive of beetles, nearly all being, however, weevils. Thus then beating the trees and sweeping any coarse herbage—and especially is sweeping useful at night time—we proceed on our way, not forgetting, if the sun

is shining, to keep an eye on any walls which are exposed to the sun, on the tops of which may often be found numbers of beetles. Ditches and ponds should be well dragged with the water net; and a good plan to enable one to take the smaller water beetles is to stir up the sand or mud at the bottom, and watch for them to appear, for they usually make a rush for the surface before taking a deeper plunge. As many localities will be mentioned in speaking of individual species sufficient has been said on the matter for the present, except to draw attention to a method of collecting during the winter when most of those already alluded to fail, viz. searching among tufts of grass growing in fields, and at the foot of walls or trees, and picking off and examining the moss from old walls. It is astonishing what a number of specimens can crowd away in a small space of moss. I once took nine specimens of *Phædon betulæ* from a small button of moss which could have been covered by a shilling.

Our specimens having been received into one or other receptacle at the time of capture, are brought home at the conclusion of the day's work, and have now to be killed and set, except, of course, those which may have been put into the benzoline bottle, which will be like Marley "dead as a door-nail." In order to kill our captures the simplest plan is to uncork the bottles and shake them into *boiling* water. If the water be quite boiling there is no fear of them ever coming to life again, as I have seen happen when the water has been below the boiling point. The requirements for setting are one or two camel-hair pencils, card—the stouter the better—a setting needle or two, made by inserting the eye end of a fine needle into a small handle, and a bottle of adhesive material, of which the best is made by putting pieces of white and flaky gum tragacanth with one or two little bits of gum arabic into water, and keeping the bottle in a warm place, until by stirring, a homogeneous gelatinous mass is the result. The advantage of tragacanth over ordinary gum is that it does not dry shiny, but as it is very liable to become mouldy it is advisable to add to it when made a drop or two of pure carbolic acid, or a small quantity of acetic acid which is said to do as well.

Having fished a few of the specimens out of the water in which they have been killed, and brushed out their legs and antennæ, they are placed on a little "dab" of gum on the card, and with the needle in one hand and a fine brush in the other, the legs, antennæ, and palpi are placed in position and left to dry. Sometimes this process requires the exercise of a great deal of patience, for no sooner have we succeeded in gumming down one leg, and are just getting the next one into nice position, than the first becomes loosened and goes into its original position beneath the body. To remedy this we in Liverpool adopt a plan introduced by Mr. Smedley, in which, instead

of using tragacanth on white cards at first, the specimens are fixed on old stout cards (old post-cards for instance) with hot thin glue. The legs and antennæ stick to this much better, and the beetles give much less trouble to set, as well as taking less than half the time occupied in the old way. The cards, with locality and date written on them, are put away until a slack time, when the specimens are reset by cutting off pieces of the card containing them and dropping these into boiling water, when the specimens at once float to the surface and are laid on blotting paper to dry, and then mounted without any trouble with tragacanth on white card. When dry the cards are cut so as to carry a single specimen, pinned, and placed in the cabinet or store-box. I have adopted the plan of raising all my specimens to the very top of a No. 8 (D. F. Taylor) or No. 9 (Kirby, Beard, & Co.) pin. The latter are much preferable, for they are a stronger pin, the points do not turn up so easily, and they possess a very great advantage in having rounded heads (not flattened) by which they can be laid hold of with a pair of pliers and the specimens removed or placed in the drawer without disarranging others.

Just one word about the preservation of specimens. From personal experience I can testify that if specimens are kept in a damp room (the rooms in a corner house, for instance, are nearly always damp) they cannot be prevented from becoming mouldy, and they require to be touched occasionally with methylated spirit. The best preventative of mites, in my opinion, and I have tried nearly everything, is *naphthaline*, a white crystalline sickly-smelling substance, which can be shaken into the drawers, or placed in the camphor cells usually present in the drawers of good cabinets, or tied in little muslin bags and pinned in the corner of the store boxes.

Having procured a few specimens of beetles, and having so mounted them that they may at the same time be guarded from injury and displayed in their most natural manner, the next step, and the one which is usually the most difficult to accomplish, and which it is the purpose of these papers to simplify to some extent, is the finding out by what name any particular species is known to the scientific world.

Just as the various kinds of man may be classified in particular groups, the members of which agree in possessing characters not possessed by others; just as we may group the European races as one class, the Negro races as another, the Mongolian races as another, and so on, so may beetles be classed in various groups—each known as a Sub-order—the members of which differ from all others in the possession of particular features of structure. Thus we may place together in one group all those beetles which agree in the possession of jaws formed for devouring flesh, with filiform antennæ, and with hind legs formed for rowing the creature through water, such group constitu-

the sub-order *Hydradephaga*. Each sub-order is composed of families—groups possessing certain family likenesses, for instance, the Carabidæ or ground beetles, the Cicindelidæ or tiger beetles; each family may contain a large number of different kinds of beetles, all having a family likeness, but still differing strongly from each other in minor points, just as the members of one human family, possessing a strong likeness in common, differ from all other families. These latter sub-divisions we call *genera*, and, in referring to any particular kind, we place the name of its genus (equivalent to the surname among ourselves, Jones, for instance) first. Then in order to distinguish between the different members of a genus, which we call *species*, we give a *specific name* to each, this specific name being equivalent to the Christian name among ourselves, only that it follows the surname, just as our names are placed in a directory—Jones, John; Jones, Mary; Jones, Robert; for instance. Thus, we speak of *Bembidium biguttatum*, *Bembidium minimum*, *Bembidium pallidipenne*, meaning the two-spotted Bembidium, the small Bembidium, and the pale-winged Bembidium respectively. Each beetle then, indeed every insect, has two names a generic and a specific name, and in uniting these the generic name is always commenced with a capital, the specific only being so commenced when it is derived from a proper name, as *Nebria Gyllenhalli*, *Sitones Waterhousii*, *Eros Aurora*, &c.

Beetles are differently classified by various writers, but I think the old plan of dividing them into thirteen *sub-orders* is by far the simplest for the beginner, especially as it does not materially alter the arrangement if later styles of classification be followed, in which *sub-orders* are omitted and a large number of *families* created. These sub-orders are—1, Geodephaga; 2, Hydradephaga; 3, Palpicornes; 4, Brachelytra; 5, Necrophaga; 6, Lamellicornes; 7, Sternoxi; 8, Malacoderma; 9, Heteromera; 10, Rhynchophora; 11, Longicornes; 12, Eupoda, and 13, Pseudotrimeria.

For the convenience of young Coleopterist, I have constructed the following table of Sub-orders:—

A. Antennæ filiform.

a. Tarsi 5-jointed.

- | | | | | | |
|--|---|---|---|---|---------------|
| 1. Legs formed for running | - | - | - | - | Geodephaga. |
| 2. Do. swimming | - | - | - | - | Hydradephaga. |
| 3. Elytra very short | - | - | - | - | Brachelytra. |
| 4. Pro-sternum furnished with a spine | - | - | - | - | Sternoxi. |
| 5. Bodies generally soft and elytra leathery | - | - | - | - | Malacodermi. |

b. Tarsi 4-jointed.

- | | | | | | |
|---|---|---|---|---|--------------|
| 1. Antennæ very long | - | - | - | - | Longicornes. |
| 2. Do. often slightly thickened at apex | - | - | - | - | Eupoda. |

- c. Anterior tarsi 5-jointed, posterior pairs 4-jointed - Heteromera.
- B. Antennæ clubbed.
- a. Club composed of flat plates - - - - Lamellicornes.
- b. Club compact.
1. Palpi longer than antennæ - - - - Palpicornes.
 2. Tarsi apparently 3-jointed - - - - Pseudo-trimera
 3. Head prolonged into a snout - - - - Rhynchophora.
 4. Head not forming a snout - - - - Necrophaga.

Sub-order I. GEODEPHAGA, comprises the ground beetles, which are characterized by having their legs formed for walking or running—*never for swimming*. The joints of all the tarsi (feet) are five in number, of which two or three of the anterior pair are generally dilated in the males. The insects composing this group are nearly all carnivorous, as the tiger beetles (*Cicindelæ*), *Carabi*, &c. Some, however, are vegetarians, as *Zabrus gibbus*, a noted corn feeder. They are chiefly nocturnal in their habits, hiding in the day-time beneath stones and rubbish, in moss, beneath bark, &c. The diurnal species are almost always bright coloured as the tiger beetles, *Elaphri*, *Notiophili*, *Amaræ*, &c.

Sub-order II. HYDRADEPHAGA have their hind legs fringed with hairs on the inner side to fit them for swimming. The tarsi are 5-jointed; the antennæ filiform, except in the genus *Gyrinus*—the whirlwig beetle—which has the antennæ club-shaped at the extremity. These insects are all carnivorous in their habits, in which they differ from the water beetles of the following group. They occur all the year round in ponds and ditches, often in great profusion in very small pools of water in exposed situations.

Sub-order III. PALPICORNES.—A very small group of beetles characterized by having their palpi much longer than the antennæ. The latter are clubbed at the extremity; the tarsi five-jointed; and the legs often spiny. Most of this group live in water, where they are very sluggish in their habits, and where they feed on vegetable substances. The favourite beetle for aquaria, *Hydrophilus piceus*, is a good example of this group. Some of its members, however, are terrestrial in their habits, such as *Cercyon* and *Sphæridium*, which live in dung.

Sub-order IV. BRACHELYTRA.—This is the most extensive group of beetles inhabiting temperate climates, the members of which are very easily distinguished by the elytra or wing covers being much shorter than the body, *rarely being half the length of the latter*. The antennæ are generally filiform, and the tarsi are four or five-jointed. The beetles comprised in this sub-order are generally known to collectors as “Staphs” (an abbreviation of

Staphylini), and to non-entomologists as rove-beetles, devil's coach-horses, and cock-tail beetles. They occur everywhere, in flowers, beneath stones, in dung, and in putrid animal or vegetable substances.

Sub-order V. NECROPHAGA or CLAVICORNES are so called because all the members of this extensive sub-order have the antennæ clavate, *i.e.*, furnished with a knob at the extremity; some, in addition, have the antennæ "elbowed" as in the weevils (see *Rhynchophora*). The tarsi are variable, and the elytra are often *slightly shorter* than the abdomen. The insects of this group—among which are the burying beetles (*Necrophori*) and their allies—are found in similar situations to the *Brachelytra*, by no means confining themselves to dead animals as one name of the sub-order would lead one to suppose. Those species with elbowed antennæ are often separated as a distinct group—*Helocera*, among which are the Histers or mimic beetles, so called from their habit of feigning death when alarmed.

Sub-order VI. LAMELLICORNES have the antennæ terminated by a club which is composed of flat plates, joined together so as to open like leaves of a book. This group comprises the giants of the beetle world, the *Dynastes* and Goliaths of tropical climates, the stag beetle, the dung beetles (*Aphodius* and *Geotrupes*), and the chafers of temperate climates.

Sub-order VII. STERNOXI are characterized by having on the underside of the first piece of the thorax (*pro-sternum*) a sharp spine or "mucro," which fits into a cavity in the meso-sternum between the middle pair of legs, by means of which the insect is enabled to leap vertically upwards when laid on its back—whence the popular name "skip-jacks" given to this group. This sub-order is only poorly represented in England by the Elaters of the New Forest, Agriotes (wire worms), &c.; but in tropical countries they abound, comprising among them some of the most beautiful of insects as well as some of the most wonderful, as the *fireflies* of many countries.

Sub-order VIII. MALACODERMI. A group of beetles, some of which are characterized by having their elytra soft and leathery, the antennæ generally filiform, and the tarsi generally five-jointed. Some few, however, as the death-watches (*Anobii*), &c., have the bodies very hard, but the antennæ terminated in a club, composed of three long flat joints, and the thorax is so developed as to almost hide the head when the insect is viewed from above. The typical representatives of this sub-order are the soldier-beetles (*Telephori*), and the glow-worm (the female of which is destitute of wings and elytra.)

Sub-order IX. HETEROMERA, a heterogeneous lot of insects, agreeing in having the *anterior tarsi five-jointed*, while the *middle and posterior are four-jointed*. The eyes are often kidney-shaped—sometimes completely divided. These insects are very variable in appearance and habits. The church-yard beetle (*Blaps*), and the meal-worm beetle (*Tenebrio*), being among the dusky nocturnal species, while the cardinal beetles (*Pyrochroæ*) are among the brightest and sun-loving. The Oil beetles (*Melæ*) also belong to this group.

Sub-order X. RHYNCHOPHORA—or Weevils—are all characterized by the head being developed anteriorly into a snout or “rostrum.” The antennæ are generally “elbowed,” that is, the first joint is very much elongated, while the second is inserted obliquely at the end of it so as to form an angle or elbow; in all the species the terminal joints of the antennæ form a club. The tarsi are four-jointed, the third joint being bilobed, the fourth springing from the notch in the third. This is a very extensive group, its members being all vegetable feeders, and consequently to be found in the neighbourhood of plants.

Sub-order XI. LONGICORNES are easily distinguished from all other beetles by the length of the antennæ, in the Scotch Timberman (*Astinomus ædilis*) for example, they are four or five times the length of the body in the male. The tarsi are like those of Sub-order X. This group is poorly represented in England, most of the species being rare; as the larvæ feed on trees the perfect insects are generally found in woods, and on the flowers of the *Umbelliferæ*, to which they seem very partial.

Sub-order XII. EUPODA. A group consisting of more or less convex insects—often capable of leaping—which have the feet like those of the two preceding Sub-orders, the antennæ filiform or slightly thickened towards the tip. The head is often hidden by the thorax. The Chrysomelas belong to this group, as also does the “potato bug” (*Doryphora decemlineata*) which created such a scare a few years ago.

Sub-order XIII. PSEUDO-TRIMERA.—A small group comprising the lady-birds (*coccinella*) and allied species, characterized by having the tarsi *apparently* only three-jointed, and having the antennæ distinctly clubbed, whence they are often classified among the *Clavicornia*.

After having collected a few species in each of these sub-orders, the student will usually be able to assign to its proper sub-order any new specimen which may fall into his hands, by means of its general appearance; but with some species this will be a matter of difficulty, as we are not capable in

the present state of our knowledge of drawing a hard and fast line of demarcation between the different sub-orders : indeed, the student of natural history who believes in a theory of evolution, does not expect to meet with any such clearly defined groups. He is interested in finding what are often called "connecting links," species which bridge over, as it were, the chasm which separates these groups from one another. In cases such as these, experience only, after a very careful examination, will define the natural position of the species, and very frequently this position is a matter of dispute among those who are best qualified to judge of the matter.

GEODEPHAGA.

Suppose now that we have before us a specimen of a beetle, which a reference to the fore-going table shews to belong the first sub-order, the *Geodephaga*, how are we to proceed in order to find its name and place among its relations? First, to be quite scientific, we ought to decide whether it belongs to the *Cicindelidæ* or the *Carabidæ*. These two families are of very unequal size, for while in Britain the former is only represented by one genus with four species, known as tiger-beetles, the latter includes about 62 different genera and several hundred species. The *Cicindelidæ* are characterized by having a little hook, almost like a small claw, attached to the apex of each maxillary palpus, and this hook is freely moveable. The *Carabidæ* have no such moveable hook or claw. But when once one has seen a tiger-beetle, and one species is common enough over the greater part of England, one need not look for this mark of distinction, as the four species of *Cicindela* are so characteristic that nothing else among British beetles can be mistaken for them. These species will be differentiated afterwards.

I will suppose that the student is sufficiently acquainted with the tiger-beetles as to be able to say whether the specimen under consideration does, or does not, belong to it, and if it does not it must belong to the *Carabidæ*. Observe to which of the following groups it belongs, by an examination of the tibiæ of the fore-legs :—



1. Anterior tibiæ slender, without any notch before the apex...*Carabides*.



2. Anterior tibiæ flattened, either wavy, toothed, or notched
on the outer side,.....*Scaritides*.



3. Anterior tibiæ with a deep notch before the apex*Harpalides*.

Carabides and Scaritides require no further sub-division at present ; but the Harpalides, which comprise about four-fifths of the British Geodephega, are again divided into four classes.

- A. Palpi with the last joint not much (if any) smaller than the preceeding one.
- a. Anterior tarsi of the males rarely dilated. Elytra generally truncate at apex - - - - - *Lebiidæ*.
 - b. Anterior tarsi of males with dilated joints. Elytra entire - *Feronidæ*.
 - c. Anterior and middle tarsi of the males with dilated joints. Elytra entire - - - - - *Harpalidæ*.
- B. Palpi with last joint very small, and needle-shaped, the preceeding one being large and swollen - - - - - *Bembidiedes*.

In the *Harpalidæ* we have some difficulty in deciding into which of the first three groups a specimen is to be placed if we possess only a female, for then the dilatation of the tarsi is not usually present ; but the *Lebiidæ* are generally easily recognized by their short elytra, which is cut off square behind, small size, and (often) bright colours, or markings in the form of a cross. The *Feronidæ* and *Harpalidæ* can be distinguished from each other by a beginner, if he possesses females alone, only when he has obtained a little experience of each group, and our recommendation to him is to wait patiently, and diligently search for a male of the species whose name is the desideratum.

FAMILY CICINDELIDÆ.

GENUS CICINDELA.

The insects belonging to this group, which are generally known as "tiger" beetles, are easily distinguished by their very prominent sickle-shaped jaws which cross each other when closed; by their prominent eyes; by the upper lip (*labrum*) being very large, and (in the British species with the exception of *sylvatica*) white; and by the elytra, which are usually green or bronze, with white or cream-coloured markings. The British species (with the exception of *Germanica* which measures about half an inch) are usually about three-quarters of an inch in length. They inhabit sandy situations and (except *Germanica*) fly in the hottest sunshine with great rapidity, much resembling blue-bottle flies, and much more difficult to capture. The British species are easily differentiated by the following short description of each.

C. CAMPESTRIS.—Head, thorax, and elytra green, the latter with four or five cream-coloured spots. Common in sandy lanes. The var. *funebria*, Stu., is described as having the upper side entirely black.

C. HYBRIDA.—Head, thorax, and elytra bronze, the latter with a cream-coloured crescent at the shoulders, another at the apex, and a transverse band of the same colour in the middle, which runs slightly backwards towards the suture and is *a little narrower in the middle*. In the var. *maritima* this band appears like two spots, one at the middle of the side and one nearer the apex on the disc of the elytra, the two spots being connected by a *very slender streak* of the same colour. The type form is abundant on sandhills on the coasts of Lancashire, Cheshire, and North Wales; the variety (if variety it be) occurs plentifully on the east coast, also in the south.

C. SYLVATICA.—Head, thorax, and elytra bronze, the latter with markings somewhat like *hybrida*, but easily distinguished from all the other British Cicindelæ by its *black labrum*. Sandy heaths in the south of England.

G. GERMANICA.—Dark green or blackish, elytra with a white spot at the shoulder and a white crescent at the apex. Occurs locally in the Isle of Wight, &c.

CARABIDÆ.

Carabides.

The British species to this sub-family are easily distinguished from all other Carabidæ by the absence of the notch on the inner of the anterior tibiæ, and are generally arranged in the nine following genera, viz: *Notiophus*, *Elaphrus*, *Blethisa*, *Cychrus*, *Carabus*, *Calosoma*, *Nebria*, *Pelophila*, and *Leistus*, and these genera may be easily separated from one another by the

following characters. It must be distinctly understood that because I have endeavoured to find the simplest (though perhaps the most artificial) means of separating genera and species, I have done so with the idea of *assisting beginners to name their specimens*, and to create a taste for the study of the order by smoothing over difficulties as far as possible, and not with the idea of supplanting any reference to, or dissection of, the minute anatomy of the insect, on which alone is based a true natural classification.

NOTIOPHILUS.—This genus is distinguished from all the other British Carabides by its small size (never measuring $\frac{1}{4}$ inch) and by the *head being nearly as wide as the elytra*. The species are of a shining bronze colour, with prominent eyes, on the forehead between which is a series of longitudinal furrows.

ELAPHRUS.—The species of this genus are all a little over $\frac{1}{4}$ inch in length; bronze or bronze-green in colour; the head narrower than the elytra; the latter without rows of punctures in striæ, but *with four rows of circular depressions* (eye spots or ocelli); the eyes are prominent *the thorax as long as broad*.

BLETHISA.—Nearly half-an-inch in length; colour bronze-black; eyes not very prominent; the elytra punctate-striate, *with two rows of depressions; the thorax broader than long*.

PELOPHILA.—Nearly half-an-inch in length; colour bronze; elytra very finely punctate-striate, *with one row of depressions; thorax twice as broad as long*.

CYCHRUS.—Length about $\frac{3}{4}$ inch; colour black; head very long; *thorax narrowed behind, much narrower than the elytra*, which are ovate; anterior tarsi of males not dilated.

CARABUS.—Length from $\frac{3}{4}$ to $1\frac{1}{4}$ inches; colours various; *thorax almost square, sides nearly straight; elytra oblong-ovate*; males with anterior tarsi dilated.

CALOSOMA.—Length from $\frac{3}{4}$ to 1 inch; colours bronze or green; *thorax much broader than long, sides much rounded*; elytra nearly square.

NEBRIA.—Either yellow with black markings (*size $\frac{3}{4}$ inch*), or black with a yellow border, or black (*size about $\frac{1}{2}$ inch*).

LEISTUS.—Either blue or blue-black, or yellow (*size a little more than $\frac{1}{4}$ inch*); the palpi very long and slender.

NOTIOPHILUS.

Legs and antennæ entirely red - - *N. rufipes*.

If the legs are partly or wholly black, notice whether the rows of punctures at the sides of the elytra—

1. Disappear before they reach the apex - *N. aquaticus* and *N. palustris*.

2. Are continued quite to the apex - - *N. biguttatus*, *N. 4-punctatus*,
N. substriatus.

Aquaticus is distinguished from *palustris* by being longer; the sides of the thorax are not so rounded in front nor so narrowed behind as in *palustris*, which is shorter and has the tibiæ yellowish in the middle. The legs in *aquaticus* are wholly black. *Biguttatus* and *4-punctatus* have the punctured striæ very distinct, the punctures being coarse and deep, while *substriatus* (which Dawson regards as a variety of *biguttatus*), has the striæ and punctures extremely fine and indistinct. All the species of the genus have a more or less distinct impression just before the middle of each elytron, and *4-punctatus* is distinguished from *biguttatus* by having *two punctures on each elytron*, one immediately in front of, the other behind, the middle. *Biguttatus* has generally a pale yellow mark at the apex of the elytra, but varieties occur (*semipunctatus*, Fab.) which have the apex entirely bronze.

Biguttatus and *aquaticus* are very common—the former in dry, the latter in wet places; *palustris* is fairly common; *substriatus* seems local, preferring sandy situations; *rufipes* is decidedly scarce; *4-punctatus* turns up now and then, but *biguttatus* often occurs with one impression on one side and two on the other, which led Mr. Crotch to suggest what is now pretty generally believed, that *4-punctatus* is simply an accidental form of *biguttatus*. It must be remembered that the insects of this genus, like many others, have a tendency to become black on boggy ground, and I have captured several specimens of *aquaticus* of this colour on boggy mountain sides near Llangollen.

ELAPHRUS.

1. Tibiæ and tarsi blue-black - - *uliginosus*.

This species also has the thorax suddenly narrowed behind the middle.

2. Tibiæ testaceous (pale yellow), tarsi blue or green - - *cupreus* and *riparius*.

Riparius is very easily distinguished from *cupreus* by having a very distinct, raised, highly polished space near the base of each elytron, which is absent in *cupreus*. The latter is also larger than *riparius*. *E. lapponicus* I have never seen. It is described as being more oblong than the others of the genus, as being larger (measuring nearly half-an-inch), and having the eye-spots on the elytra very obscure.

The species of this genus inhabit swampy places, where they run with great agility during the hottest sunshine, reminding one of a *Cicindela*. *Cupreus* and *riparius* are common; *uliginosus* is local; and *lapponicus* is very scarce, the only specimens, as far as I know, having been captured on mountains in Scotland.

BLETHISA.

The only species, *B. multipunctata*, is sufficiently described in the characters of the genera. It is rather a local species, inhabiting similar localities to the *Elaphri*.

CYCHRUS.

The only British species, *C. rostratus*, is of a dull black colour, and is found in woods, under dead leaves, &c., and is generally distributed over the country. This insect has the power of causing a shrill creaking sound when handled, by rubbing the base of the abdomen against the base of the elytra.

CARABUS.

C. INTRICATUS.—Deep violet; *elytra much wrinkled longitudinally*; legs black. Very rare. Has occurred in Devonshire.

C. AURATUS.—*Head and thorax green; elytra with three raised longitudinal ribs* of a green colour, the spaces between being bronze; *legs red*. Rare, a doubtful native.

C. NITENS.—*Head and thorax coppery; elytra with three ribs* which are black; while the intervals are bronze-green; outer margin of the elytra bright coppery; *legs black*. Not uncommon in swampy places. It used to occur plentifully at Southport.

C. CLATHRATUS.—Dark greenish bronze; *elytra with three ribs*, between each two of which is *a row of large round depressions*. Occurs in Scotland and the north of Ireland.

C. GRANULATUS.—Bronze. *Elytra with three ribs* between each two of which is *a row of small elevations* (granules.) Common.

C. CANCELLATUS.—Similar to *granulatus*, but with the basal joint of the antennæ and the femora, red. Rare, questionably British.

C. MONILIS.—Variable. Bronze, green, or black. Each elytron *with three rows of granules, between each two of which are three raised lines*. The var. *consitus* has the central raised line more prominent than the lateral ones. Tolerably common, especially in the south.

C. ARVENSIS. Resembles *monilis* in colour and sculpture, but is much smaller; the thorax is narrower; and it has a flatter appearance. I have taken this species on the mountains near Llangollen and on Snowdon. It never occurs except at a considerable elevation.

C. CATENULATUS.—Black, with a violet margin to the thorax and elytra. Sculpture of elytra somewhat like *monilis*, but less distinct. Common in heathy situations.

C. VIOLACEUS. *Black, with a violet margin* to the thorax and elytra—the latter *without any ribs or rows of elevations*, but rather *rough* in appearance. Common.

C. GLABRATUS.—*Black, without a violet margin; the elytra almost smooth.*
A mountain species, not rare in Scotland.

C. NEMORALIS.—Head and thorax black, the latter with violet margins;
elytra bronze or greenish, with three rows of depressions. Common.

C. CONVEXUS.—Head and thorax black, the latter with bluish margins;
elytra black, with three rows of somewhat indistinct impressions. A small
species. Rare.

The individuals of this genus vary considerably in size, *nitens*, *convexus*,
and *arvensis* being about $\frac{3}{4}$ inch, whilst *intricatus*, *violaceus*, *catenulatus*, and
monilis are among the largest, measuring from 10 to 14 lines (12 lines=
1 inch.) The males of this genus have the first four joints of the anterior
tarsi widely dilated; in the female these joints are not broader than those of
the other feet; the females are also usually more rounded at the sides, and
also larger than the males.

NEBRIA.

1. Size, over half-an-inch.

Elytra yellow, with dark markings - - *complanata*.

Elytra pitchy black, with pale yellow margins - - *livida*.

2. Size, under half-an-inch - - *brevicollis* and *Gyllenhalii*.

Gyllenhalii differs from *brevicollis* in being narrower, with the legs and
antennæ generally darker; and the elytra, which in the latter are crenate
striate, in *Gyllenhalii* are very finely punctured, sometimes impunctate.

Complanata is very local, but abundant where it does occur, viz., on shores
of the West of England and Wales, as Swansea, &c. *Livida* occur abun-
dantly in crevices of the clay cliffs at Scarborough; *brevicollis* is one of the
most abundant beetles everywhere; while *Gyllenhalii* occurs only on the
Welsh and Scotch mountains, at a considerable elevation, on Snowdon occur-
ing from 2,000 feet up to the summit.

PELOPHILA.

P. borealis is the only British species, and is very scarce, the localities
given by Mr. Dawson ("Geod. Brit." p. 49), being Loch Neagh and Kil-
larney in Ireland, and the Orkney Islands and West of Scotland.

LEISTUS.

(a.) Colour bright blue - *spinibarbis* and *montanus*, the former of which
has the thorax blue with the very extreme margin often reddish;
the latter has the thorax much narrower behind and the sides of
the thorax distinctly red.

(b.) Colour blue-black - - *fulvibarbis*.

(c.) Colour reddish yellow - *ferrugineus* and *rufescens*. *Ferrugineus*

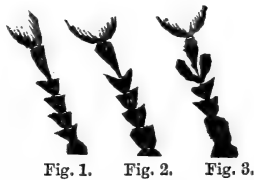
is entirely reddish yellow, while *rufescens* has the head and the apex of the elytra dusky or black.

All the species of this genus, except the second (*montanus*), seem to be fairly common, although *rufescens* appears rather local. *Montanus* is a species which occurs, as its name implies, in mountainous regions, in Wales, north of England, and Scotland, but it only occurs very rarely.

Lebiides.

Passing from the *Carabides*, and omitting for the present any reference to the *Scaritides*, we commence with the first group of beetles which have notched anterior tibiæ, the *Lebiides*, distinguished by their truncate elytra, which are generally shorter than the abdomen. The last species in this family, *Masoreus Wetterhalli*, has the elytra so long and so slightly truncate at the apex that it may cause a little trouble to its fortunate captors, but the description given at the close of this article will, I think, enable them to recognise it. The *Lebiides* (including the genus *Brachinus*, which is separated as a distinct family by some authors) contain the following genera:—*Brachinus*, *Drypta*, *Polystichus*, *Odacantha*, *Ætophorus*, *Demetrias*, *Dromius*, *Blechrus*, *Metabletus*, *Lionychus*, *Lebia*, *Cymindis*, and *Masoreus*. The latter of these is easily separable by reason of its having the anterior tibiæ covered with strong spines, the whole of the remaining genera having the legs smooth and unarmed.

A. Anterior tibiæ without spines.



1. Fourth joint of anterior tarsi deeply bilobed. (See fig. 3, anterior tarsus of *Demetrias atricapillus*.)

Upper side blue; thorax very long; antennæ and legs yellow-red - -

Drypta.

Head black; thorax red. Elytra pale, with the suture, a diamond-shaped spot behind the middle formed by both elytra, and a round spot at the side margin, black - - *Ætophorus*.

Elytra pale, without a spot on the suture, with or without a spot before the apex - - *Demetrias*.

2. Fourth joint of anterior tarsi emarginate (fig. 2, anterior tarsus of *Lebia chlorocephala*.)

Thorax much longer than broad - - *Odacantha*.

Thorax much broader than long - - *Lebia*.

3. Fourth joint of anterior tarsi simple (fig. 1, anterior tarsus of *Dromius linearis*.)

a. Size over $\frac{1}{4}$ inch.

Elytra blue-black - - *Brachinus*.

Elytra brown or pitchy. Head contracted behind to form a distinct neck, elytra parallel sided - - *Polystichus*.

Head not contracted behind; elytra rounded at sides - - *Cymindis*.

b. Size under $\frac{1}{4}$ inch.

Elytra blue or green - - see *Brachinus*.

Elytra pale yellow, brown, or black, or with dark markings; antennæ and legs yellow - - *Dromius*.

Antennæ and legs black or dark brown - - *Blechnus*, *Metabletus*, and *Lionychus*.

B. Anterior tibiæ furnished with strong spines - - *Masoreus*.

BRACHINUS.

The commonest British species, *B. crepitans*, can hardly be mistaken for any other British beetle. The head and thorax are bright red whilst the elytra are deep blue-black; the antennæ red, with the exception of the 2nd, 3rd, and 4th joints, which are more or less dusky; and the legs are red. The specific name has reference to its power of defending itself from its enemies by producing a discharge of acrid vapour from the anus, attended with a crackling sound—whence the name “Bombardier” beetle, which is sometimes applied to it. In the northern counties it seems to be quite unknown, but where it does occur, on the banks of tidal rivers, as at Gravesend and in the Isle of Wight, it is generally very abundant. Two other species of *Brachinus*, or rather one other species (*sclopeta*), and a doubtful species (*explodens*) occur in England but rarely. They are both much smaller (2-3 lines.) *B. sclopeta*, only a few specimens of which have been recorded, and those principally from the south coast, is easily recognised by its having a bright red dash at the base of the suture of the elytra; while *explodens* is said to differ from *crepitans* by its smaller size, and by having scarcely any distinct striæ on the elytra.

DRYPTA.

D. dentata, the only British species, is easily recognised from the description given above. It is a beetle which measures nearly half-an-inch in length, but is a prize, only having occurred in a few localities in the south.

POLYSTICHUS.

The British species *P. vittatus* is easily distinguished from all other Brit-

ish *Geodephaga* by having a bright red streak down each of its pitchy-brown elytra, running parallel with the suture. This is also a rare species, an indefatigable collector like Mr. Dawson having only taken a single specimen (in the Isle of Wight.)

ODACANTHA.

The single species, *O. Melanura*, is easily known by its long narrow thorax which is bluish in colour, and its elytra which are yellow-red with the apex blue black. It measures about a $\frac{1}{4}$ inch in length, and occurs commonly in the fen districts.

ÆTOPHORUS.

Æ. imperialis is sufficiently characterized by the diamond-shaped black spot on the suture, which is often connected with the spot at the side margin by a streak of the same colour. It only occurs very sparingly in the fen counties.

DEMETRIAS.

Of this genus we have two British species, both fairly common and generally distributed. *Atricapillus* has the elytra pale with the suture sometimes a little dusky; *monostigma* has the suture, and a spot before the apex of each elytron black.

DROMIUS.

This is a somewhat difficult genus for a beginner, especially if he obtain some of the smaller species, and as several of these are *desiderata* with myself, I have to do my best to describe them from other descriptions. The genus may be artificially divided into seven groups of species, according to the colour and markings of the elytra.

Gr. 1.—Elytra entirely yellow:

Head black, thorax red; length $\frac{1}{2}$ an inch. - - *D. melanocephalus*.

Gr. 2.—Elytra yellowish, the suture dark, this colour widening behind to the apex. Head and thorax very long, - - - *D. longiceps*.

Gr. 3.—Elytra brownish-yellow, darker at the apex; head and thorax not long. - - - *D. linearis*.

Gr. 4.—Elytra brown, without light spots, and not darker at the apex. The two species of this group *agilis* and *meridionalis* (the latter of which Mr. Dawson believed to be a variety of the former) are slightly difficult to separate. In *agilis* the elytra are wider behind and have impressions on the *third* and sixth interstices of the striæ; while *meridionalis* is parallel-sided, and has impressions in the sixth interstice only.

Gr. 5.—Elytra dark brown, with a light spot at the base (not reaching the side margin), and another light spot near the apex.

Posterior light spot involving almost the whole of the apex ; size $2\frac{1}{2}$ lines.

D. quadrimaculatus.

Posterior light spot small and round ; size $1\frac{1}{2}$ to 2 lines - -

D. quadrinotatus.

Gr. 6.—Elytra yellowish with dark markings, the scutellum and shoulders dark - - - - - *D. quadrisignatus*

Gr. 7.—Elytra yellowish, with dark markings, but the *shoulders are yellow*...

D. nigriventris D. vectensis, D. sigma.

These species, which, I have no doubt are easily distinguishable when compared together, are difficult to separate on paper ; *nigriventris* (which is often almost without markings) has the front half of the elytra pale, with a black suture, the hinder half being more or less dark with a small light spot behind, near the apex ; *vectensis* and *sigma* have the elytra pale, with a dark toothed band across the middle, the end of this band ceasing at the side margin in *sigma* whilst in *vectensis* the band is produced at the sides as far as the apex. All three species are about $\frac{1}{8}$ inch in length.

The species of the genus *Dromius* are found generally beneath bark, on herbage, or at the roots of grass. They vary considerably in their distribution : *D. longiceps* and *sigma* are principally fen insects ; *D. vectensis*, an insect comparatively new to science, has occurred only in the Isle of Wight ; *D. nigriventris* is found, according to Dawson, in damp places (I take it sparingly under heather in hilly places) ; *D. quadrisignatus* is not very frequently taken ; whilst *D. linearis*, *agilis*, *meridionalis*, *quadrimaculatus*, *quadrinotatus*, and *melanocephalus* are common and generally distributed.

BLECHRUS.

The only species of this genus, *B. maurus*, is easily distinguished from species of the two following genera by its small size ($1\frac{1}{4}$ lines), by its *entirely black colour*, the elytra being nearly smooth, or with very faint traces of striæ near the suture. This beetle seems fairly common, but if found on clayey ground which is full of cracks, and with the sun shining upon it, as I first made its acquaintance, the collector will well deserve all he bottles. The late Mr. Rye, in his excellent "British Beetles," likens this species to an "animated grain of gunpowder."

LIONYCHUS.

The single British species, *L. quadrillum*, has the head and thorax black, the latter having a very small, but acute tooth near each posterior angle ; elytra nearly square, black, with a round light spot at each shoulder, and another (often indistinct or wanting), near the apex of each elytron ; the interstices between the striæ have a row of distinct punctures. This species appears to be common where it does occur, but very local.

METABLETUS.

The peculiar obliquely narrowed thorax of this genus is sufficient to distinguish it from any other of the *Lebiidae*, but this has to be seen to be understood, as its appearance cannot well be described on paper without a diagram. We have three British species:

M. truncatellus has the body perfectly black, and the elytra without any depressions; the base of the antennæ and the tibiæ are pitchy.

M. obscuro-guttatus and *M. foveola* are bronze or bronze-brown, the elytra with two distinct depressions in the third interstice (*i.e.* between the second and third striæ), but the former has a light spot at the shoulder, and sometimes another at the apex, of each elytron, while the latter is unicolorous, and with the two depressions very distinct. *M. obscuro-guttatus* occurs only sparingly, but several localities have been recorded; *M. foveola* is very common everywhere. About Liverpool it is very common among the dead sallow leaves on our sand hills.

LEBIA.

1. Elytra blue or green. Antennæ black, with only the basal joint red - *L. cyanocephala*.
Antennæ black, with the first, second, and part of third joints red - *L. chlorocephala*.
2. Elytra black, with a large red spot at the shoulder - - *L. turcica*.
3. Elytra red, with a transverse black band reaching across the middle and extended to the scutellum forwards and to the apex backwards, thus forming a distinct black cross on a pale red ground - *L. crux-minor*.

Of these species *L. turcica* is questionably British; *L. crux-minor* is very rare indeed; *L. cyanocephala* is very local; and *L. chlorocephala* is common in many places. These beetles seem to have a partiality for the roots of gorse and broom.

CYMINDIS.

Thorax red; elytra black, with a yellow spot at the shoulder, and yellow side margins - - *C. axillaris*.

Thorax and elytra brown, the latter rather lighter towards the base - *C. vaporariorum*.

MASOREUS.

The only British species, *M. Wetterhalli*, bears very little resemblance to the other *Lebiidae*; its elytra are only very slightly truncate behind, and are only a little shorter than the abdomen. The head and thorax are pitchy red, the latter being very short and nearly twice as broad as long; the elytra are yellow red at the base, but pitchy red on the hinder three-fourths; the

antennæ and legs are reddish, the anterior tibiæ, as described above, being furnished with strong spines. Its length is slightly under $\frac{1}{4}$ inch. This species, which Mr. Dawson, in his "Geodephaga Britannica," classes along with *Harpalus*, is local, Mr. Dawson's localities being the Chesil bank, near Weymouth; the Deal sandhills; and near Sheerness.

FERONIDÆ.

The sub-division of the Harpalides to which the name Feronidæ is applied includes by far the greater number of the British species of Geodephaga. While many of them are very distinct and easy of recognition, there are others, chiefly members of the large genera *Anchomenus*, *Pterostichus* and *Amara*, which are much more difficult to determine; in many cases they require to be carefully compared with closely allied species before the name of the specimen under consideration can be determined with certainty.

They are mostly insects of dark colours, prowling about by night in search of their food, but some there are among the *Anchomeni*, the *Pterostichi*, *Amara*, &c. which possess such brilliant green or coppery surfaces that they obtain, for these are usually diurnal in their habits, the name of "sun-shiners" or "sparklers."

The FERONIDÆ are easily divisible into two groups, characterised as follows:—

A.—Anterior tarsi of male with *three* joints dilated.

B.—Anterior tarsi of male with *two* joints dilated.

Group A.

Antennæ with the first six joints furnished with long bristles - *Loricera*

Antennæ without long bristles.

Thorax joined to elytra by a distinct neck:

Length $\frac{3}{4}$ inch - - *Broscus*.

Length $\frac{1}{4}$ inch - - *Miscodera*.

Thorax not joined to elytra by a distinct neck.

a.—Colour of elytra red or yellow with black markings, or black with a yellow margin.

Elytra *pale yellow* with black markings - - *Callistus*.

Elytra *reddish yellow* with black markings, or dark with reddish spots or margin - - *Badister*.

b.—Colour of elytra not as a.

I.—Thorax as wide behind as the base of the elytra:

Length over $\frac{1}{2}$ inch.

Dull black and very convex - - *Zabrus*.

Shining black and flattened - - *Pterostichus striola*.

Length under $\frac{1}{2}$ inch - *Oodes*, *Calathus* (part), and *Amara* (part.)

The only British species of the genus *Oodes* is easily distinguished from an *Amara*, which it superficially resembles, by it having the thorax quite smooth, the colour dull black, and the elytra parallel-sided.

In the part of *Amara* included in Sub-section I, the thorax is rounded at the sides and narrowed in front, with distinct impressions in the posterior angles; the colours are bronze or brassy black (rarely quite black). The insects are oval in outline, with short legs.

The genus *Calathus* is easily recognised by the elongate-oval outline, the nearly square thorax, the black or red colours (never coppery or brassy), and the long slender legs of the species. The hinder tarsi are marked with a distinct groove, which runs along the whole length of the upper surface, passing from joint to joint.

II.—Thorax narrower at the base than the elytra:

1.—Elytra brilliant green, or green with a yellow border; or bright coppery; or black with long yellow hairs.

Elytra hairy and rough - - *Chlœnius*.

Elytra smooth and hairless.

Posterior angles of the thorax rounded - - *Anchomenus* (part.)

Posterior angles of the thorax distinct - - *Pterostichus* (part.)

2.—Elytra blue-black - - *Pristonychus*.

3.—Elytra bronze or greenish bronze - - *Anchomenus* (part), *Olisthopus* and *Amara* (part.)

In *Amara* the posterior angles of the thorax are more or less distinct; in this group of the genus *Anchomenus* and in *Olisthopus* they are rounded. The points of difference between the latter will be given afterwards.

4.—Elytra red at base and blue or green at apex - - *Anchomenus prasinus*.

5.—Elytra dark or reddish.

a.—About one inch in length; the elytra with indistinct striæ - - *Sphodrus*.

b.—Under $\frac{3}{4}$ inch in length, or if longer, with distinct striæ.

1.—Anterior tibiæ slender, scarcely thickened at the apex - *Calathus piceus*; *Taphria*; and part of *Anchomenus*.

Calathus piceus is easily distinguished by the furrow on the upper surface of the hinder tarsi. *Taphria* has the terminal joint of the labial palpus distinctly triangular or hatchet-shaped. *Anchomenus* has the terminal joint of the palpi cylindrical, and the hinder tarsi not grooved.

2.—Anterior tibiæ thickened very distinctly at the apex - *Stomis*, *Platyderus*, *Pterostichus* (part), and *Amara* (part.)

Stomis is at once recognised by its long, very prominent mandibles,

Platyderus by its reddish thorax and elytra, the sides of the latter being nearly straight.

Pterostichus is generally narrower, the upper side chiefly shining black, and the third interstice of the elytra with one or more impressions.

The species included in this part of *Amara* are generally broad, the prevailing colour being pitchy black or bronze-brown; and the third interstice of the elytra is without impressions.

Group B.

a.—Size, under $\frac{1}{4}$ inch - - *Trechidæ* (see after.)

b.—Size $\frac{1}{4}$ inch or more.

1.—Last joint of palpi hatchet-shaped.

Elytra black - - *Licinus*.

Elytra spotted or marked with red - - *Panagæus*.

2.—Last joint of palpi not hatchet-shaped.

Thorax longer than broad, narrowed behind - - *Patrobus*.

Thorax not longer than broad, and scarcely narrowed behind - - *Pogonus*.

LORICERA.

The only British species, *L. pilicornis*, easily distinguished from all the other Geodephagous beetles by the long bristles on the basal joints of the antennæ, measures about $\frac{1}{4}$ -inch in length, is of a dark bronze colour, and the elytra have each a row of three distinct depressions in the third interstice. The species occurs everywhere abundantly, under stones and in moss, &c.

PANAGÆUS.

Of this genus we have two species, *P. crux-major* and *P. quadripustulatus*. The former is the larger of the two measuring 4 lines in length, and has the elytra red with the base, suture (narrowly), apex, and a broad band across the middle, black. The latter band with the dark suture forms the cross from which is derived its specific name. *P. quadripustulatus* is a smaller insect, about 3 lines in length, in which the ground colour of the elytra is black, with a red band across the front and a red spot on each elytron near the apex. Both species are principally fen insects, but *crux-major* seems more widely distributed than its congener.

CALHISTUS.

The single species, *C. lunatus*, one the most handsome of British Geodephaga, is very easily recognised by the colour of the elytra, which are pale yellow with black markings as follows: a spot at the shoulder, a band across the middle of each elytron which reaches to the side margin but not quite to the suture, and the hinder part of the elytra, leaving only a minute yellow

spot at the extreme apex, the dark portion being connected at the side margin with the transverse band. This species seems to be very local, although when it does occur it seems to be fairly common. It has recently occurred in some numbers at Box Hill, in Surrey.

CHLÆNIUS.

The four species of this genus are easily separable. *C. holosericeus* is black, has the interstices of the elytra granulose and thickly covered with yellowish hairs; *vestitus* has the elytra green with a yellow margin; *nigricornis* and *Schranki* have the elytra bright green without a yellow margin. *Nigricornis* has the first joint of the antennæ red, and the hinder angles of the thorax blunt while *Schranki* has the hinder angles of the thorax right angles, and the first three joints of antennæ red. *Schranki* and *holosericeus* are extremely scarce; *vestitus* and *nigricornis* seem generally distributed, occurring in swampy places; the latter species being often found in numbers in hollow stems of reeds. In length all the species measure about 4 to 5 lines.

OODES.

O. helopioides, the single British representative of this genus, has a superficial resemblance to an *Amara*, from which, however, it may be easily distinguished by its dull black colour, its impunctate thorax, which is without basal depressions, and its parallel sided elytra. This species seems generally distributed; Mr. Dawson's localities are principally in the south, and Mr. Smedley took the species near York.

LICINUS.

We have two species of this genus in Britain, *L. depressus* and *L. silphoides*, which are easily separable. Both are black in colour, and much flattened, but the interstices of the elytra are wrinkled, and the third, fifth and seventh raised so as to form slight ribs in *silphoides* while in *depressus* the interstices are flat and thickly punctured. Both species measure about five to six lines in length, and are found in chalky localities, as at Box Hill.

BADISTER.

We have four species divisible as follows:

- 1.—Thorax black, with yellowish margins - - *B. sodalis* and *B. peltatus*.
- 2.—Thorax red - - *B. unipustulatus* and *B. bipustulatus*.

Sodalis is distinguished from *peltatus* by being rather smaller (2 lines), and by having a large yellow spot at the shoulder, whereas *peltatus* measures about $2\frac{1}{2}$ lines and has no shoulder spot. Both species have the margins of the elytra yellow.

Unipustulatus differs from *bipustulatus* by being larger ($\frac{1}{4}$ in. in length), the head wider in proportion to the thorax, and the latter more narrowed behind, and by having the underside of the breast with a yellow spot on each side. *Bipustulatus* has the underside of the breast entirely black, and is a more slender looking insect. *Bipustulatus* is common and generally distributed; *unipustulatus* and *sodalis* are local, and *peltatus* rather scarce.

BROSCUS.

B. cephalotes is sufficiently distinguished from all other Geodephaga by its size ($\frac{3}{4}$ inch) and the distinct neck to the elytra. The colour is dull black. It is common on most sandy shores, where it forms a burrow under drift-wood, &c., but it is not confined to the coast, being occasionally taken very far inland.

MISCODERA.

The single species *M. arctica*, which occurs on high mountains in Wales and Scotland, has a superficial resemblance to a *Dyschirius* from its shining bronze colour, rounded thorax, and elongate form, but is easily distinguished by its larger size (3 lines), and by not having the anterior tibiæ flattened and toothed.

SPHODRUS.

S. leucophthalmus somewhat resembles a large wide *Broscus*, but is easily known from that genus by the absence of a distinct neck to the elytra. Its colour is dull black, and the length about one inch. It occurs, but not commonly, in cellars, and is known from all other large Geodephaga by the almost absence of striation on the elytra.

PRISTONYCHUS.

P. terricola, the only species of this genus, is common in cellars and out-houses, and is at once recognised by its shining blue-black colour, and by the distinct row of impressions in the outer interstice of the elytra. In length it measures from $\frac{1}{2}$ to $\frac{3}{4}$ inch.

CALATHUS.

The seven species of this genus may be separated by means of the following table:—

A.—A row of impressions in the third, and another row in the fifth interstice of each elytron - - *cisteloides*.

B.—A row of impressions in the third interstice only.

1.—Thorax with the side margin turned upwards behind to form a side-border; posterior angles rounded - - *piceus*

2.—Thorax without a raised side-border, and the hinder angles distinct.

a.—Length, 4 to 5 lines :

Colour pitchy ; very broad - - *fuscus*.

Colour shining black ; narrower - - *flavipes*.

b.—Length, 3 to 3½ lines :

Thorax and elytra reddish brown - - *mollis*.

” ” shining black - - *micropterus*.

Thorax red ; elytra black - - *melanocephalus*.

Micropterus is easily recognised from a scarce variety of *melanocephalus* (*nubigena*) which occurs on mountains in Scotland, and from *flavipes*, by having the sides of the thorax more rounded. These species have the sides nearly straight. *C. piceus*, about 4 lines in length, has very much the appearance of an *Anchomenus*, but it is at once known from members of that genus by its furrowed tarsi. *Cisteloides* and *flavipes* have a great general resemblance, but may be distinguished as above ; *cisteloides* also is much larger, varying from five to nine lines in length. The commonest species is undoubtedly *C. melancephalus*, which is perhaps one of the first beetles met with by a beginner. *C. cisteloides* is also abundant on waste lands ; *C. flavipes* and *mollis* seem to prefer sandy coasts ; *fuscus* is a somewhat local insect ; *piceus* is generally distributed, and, I think, more partial to woods than the other species of the genus ; and *micropterus* occurs sparingly on high mountains in Wales and Scotland.

TAPHRIA.

T. nivalis, which measures about ¼ inch in length, greatly resembles an *Anchomenus*, but is easily distinguished by its more parallel form, shorter and more rounded thorax, and light-coloured legs and antennæ. Its rounded thorax also causes it to somewhat resemble *Olisthopus*, but it is known from the latter by its deep black colour. The species seems generally distributed. It occurs with us under stones in damp hedge bottoms.

OLISTHOPUS.

The only species, *O. rotundatus*, is easily separated from *Anchomenus* by the three following characters, no species of that genus possessing these three together, viz :—Yellow palpi, antennæ, and legs ; short and wide (almost round) thorax ; bronze brown colour. The species is generally distributed, but seems to prefer hilly situations.

STOMIS.

S. pumicatus is easily known by its elongate form and prominent jaws. In size it is about ¼ inch ; colour black, with legs and antennæ red. Generally distributed.

PLATYDERUS.

P. ruficollis is a somewhat local insect, with a very flattened appearance, red thorax, and pitchy elytra, with sides nearly parallel; the thorax has a deep central furrow, with shorter furrow on each side at the base. Length slightly over $\frac{1}{4}$ inch.

ANCHOMENUS.

The species of the genus *Anchomenus* have been artificially divided (in the analytical table of genera), into four groups; but as this division has been based upon a character (colour) which cannot always be depended on in this genus, it has been thought best to first give the names of the species which fall into these groups, and then to append a short description of each species without any further tabulation.

GROUP I.—Consists of those Geodephaga which have the three basal joints of the anterior tarsi of the male dilated; the elytra brilliant green or coppery; with the posterior angles of the thorax rounded - - *Anchomenus marginatus*, *A. sex-punctatus*, and *A. ericeti*.

GROUP II.—Tarsi as above; elytra bronze, greenish bronze, or black with a greenish reflection - - *A. parum-punctatus*, *A. gracilipes*, *A. 4-punctatus*, *A. viduus*, *A. versutus*, *A. micans*, and *A. scitulus*.

GROUP III.—Tarsi as above; elytra red at the base with a bluish-green patch on the posterior two-thirds - - *A. prasinus*.

GROUP IV.—Tarsi as above; elytra black or brown, with the legs slender, the hinder tarsi not furrowed, and the apical joint of the palpi cylindrical - *A. Junceus*, *A. livens*, *A. albipes*, *A. oblongus*, *A. atratus*, *A. piceus*, *A. gracilis*, *A. fuliginosus*, *A. Thoreyi* and *A. puellus* (also the var. *moestus* of *A. viduus*).

A. Junceus.—Shining black; antennæ and legs pitchy; thorax narrowed behind, the sides somewhat wavy, and the posterior angles sharp right angles. Length 5 to 6 lines. This species, which is common and generally distributed—occurring often at the roots of trees, and often turning up at sugar, is the largest of the genus, and is easily recognised by its large size and shining black colour.

! *A. livens*.—Brownish-black; antennæ and legs reddish; thorax somewhat narrowed behind, but with the sides nearly straight, and the posterior angles somewhat rounded. Length about 4 lines. Rare.

A. prasinus (dorsalis).—Blue-Green; base of the antennæ and legs yellow; *elytra* reddish, with a blue-green patch on the hinder half or two-thirds. Length $\frac{1}{4}$ inch. One of the most abundant beetles, especially during winter.

A. albipes.—Nearly black; the legs and antennæ very pale yellow. Length about $3\frac{1}{2}$ lines. Very common in wet places, and recognised at once by its pale (nearly white) legs and antennæ.

A. oblongus.—Brown; antennæ and legs yellow; thorax very much narrowed behind, with the *hinder angles sharp*. Length slightly under three lines. Moderately common, but local.

A. marginatus.—Green, greenish bronze or coppery; antennæ and legs brownish; *elytra* with a pale yellow margin. Length 5 lines. Very common in damp places and recognised at once by the pale margin to the *elytra*.

A. sexpunctatus.—Head and thorax brilliant green; *elytra* bright copper, with six or seven impressions in the third interstice. Length four lines. A local species, easily recognised by its brilliant colouring. It used to occur (and may do so still) on Wimbledon Common, and specimens have been captured in the court yard of the British Museum.

A. ericeti.—Head, thorax, and *elytra* bright coppery; *elytra* with six or seven impressions in the third interstice. Length about 3 lines ($\frac{1}{4}$ inch) Local, on mosses and heaths. Distinguished from the preceeding species by the head and thorax being the same colour as the *elytra*, and by its distinctly smaller size.

A. parumpunctatus.—Head and thorax green; *elytra* coppery or bronze, with three or four impressions in the third interstice. Length $3\frac{1}{2}$ to 4 lines. Very abundant, and occasionally very puzzling on account of its variable colour. I have specimens nearly black (from boggy ground).

A. gracilipes.—Head, thorax, and *elytra* bronze; third interstice of the latter with four or five impressions. Length $3\frac{1}{2}$ to 4 lines. Rare. Distinguished from *parumpunctatus* by being rather narrower, and with the head and and thorax concolorous with the *elytra*.

A. quadripunctatus.—Blackish bronze; thorax very wide; *elytra* with four deep impressions in the interstice. Length $2\frac{1}{2}$ lines. Very scarce. Its small size and bronze colour would easily distinguish it from any other species of the genus.

A. viduus.—Head and thorax black, the latter with broad raised side-border; *elytra* dark green, with deep striæ. Length 4 lines. Common. A dark variety of this insect (*moestus*) which is entirely black, is about as

common as the type ; but both the latter and the variety may be easily recognised by their wide thorax (which is distinctly broader than long), the raised thoracic side-margin, and the deep striæ on the elytra.

A. versutus.—Also has a broad raised side border to the thorax, but it is smaller ($3\frac{1}{2}$ lines); the thorax is broader and shorter; and the striæ on the elytra are fine. The colour is the same as *viduus*.

A. atratus.—Head, thorax, and elytra shining black; legs pitchy. Length $3\frac{1}{2}$ lines. Common in damp places. Easily recognised from the other black species with pitchy legs, by its thorax which is about as long as broad.

A. micans and *A. scitulus*.—Both these species have the head, thorax, and elytra black, with a greenish reflection, and the legs brown; but *scitulus* has the thorax distinctly narrower behind, while in *micans* it is nearly as broad behind as in front. Both species are fairly common, and measure about $\frac{1}{4}$ inch in length.

A. piceus.—Head and thorax nearly black; elytra mahogany brown and parallel sided; the thorax not narrowed behind, about as broad as long. Length 3 lines. Fairly common, like most of the genus, in damp places. Can be easily distinguished from *Thoreyi*, which it most nearly resembles, by the thorax not being narrowed behind.

A. gracilipes.—Entirely black; thorax narrowed behind. Length 3 lines. The only species with small thorax and black legs. Common.

A. fuliginosus.—Head and thorax black; elytra ovate and pitchy; thorax narrowed behind; legs brown. Length nearly 3 lines. Common.

A. Thoreyi.—Head and thorax black; elytra oblong and more reddish than in *fuliginosus*; thorax narrowed behind; legs brown. Length 3 lines. Not very common.

A. puellus.—Closely resembles *fuliginosus*, but the thorax is narrower, and the elytra not quite so rounded at the sides; and the insect is slightly longer ($3\frac{1}{4}$ lines). Not so common as either of the preceding.

PTEROSTICHUS.

The twenty-two British species of this genus vary so much among themselves, not only in colour and size but in general structure and appearance, that they were classed by the less recent writers on Coleoptera under at least eight different genera, viz: *Abax*, *Adelosia*, *Pæcilus*, *Pterostichus*, *Argutor*, *Steropes*, *Omasus*, and *Platysma*.

In the analysis of genera it will be observed that the species of this genus fall into three groups, viz.:

a. Species of the *Feronidæ* having the upper side black, the base of the thorax as wide as the elytra, and length over $\frac{1}{2}$ inch - - *P. striola*.

b. Species with the thorax narrower at the base than the elytra, the latter being brilliant green or coppery - - *P. cupreus*, *P. versicolor*, *P. dimidiatus*, and *P. lepidus*.

c. Species with the thorax narrower at the base than the elytra, the latter being dark or pitchy, and with the anterior tibiæ distinctly thickened towards the apex.....the remaining seventeen species, which may be further sub-divided, as follows :—

A. Colour pitchy black or pitchy red - - *P. picimanus*.

B. Colour shining black.

1. Length exceeding $\frac{1}{4}$ of an inch.

a. Posterior angles of the thorax distinct - - *P. niger*, *P. vulgaris*, *P. parumpunctatus*, *P. anthracinus*, *P. nigrita*, *P. gracilis*, *P. oblongo-punctatus*, and *P. vitreus*.

b. Posterior angles of the thorax rounded - - *P. aterrimus*, *P. madidus*, and *P. æthiops*.

2. Length not exceeding $\frac{1}{4}$ of an inch - - *P. vernalis*, *P. inæqualis*, *P. minor*, *P. strenuus*, and *P. diligens*

GROUP A. (Genus *Abax* of Bonelli).

P. striola, the largest species of the genus, is easily recognised by the characters above given. The elytra are nearly flat, with deep striæ; the length is generally $\frac{3}{4}$ of an inch. Common everywhere, under stones, clods of earth in fields, and garden refuse.

GROUP B. (Genus *Pæcilus* of Bonelli).

First two joints of the antennæ red, the elytra ovate, coppery, or green; length from $4\frac{1}{2}$ to 6 lines - - *P. cupreus*.

[*P. versicolor*, by some authors thought to be only a variety of *P. cupreus*, seems to differ in being somewhat smaller and narrower, and in having the middle of the base of the thorax *not punctured*, as in the case with *cupreus*. The variety of *cupreus* known as *P. affinis* (of Sturm) has the legs entirely red, whereas they are black in the type.]

First two joints of the antennæ reddish beneath; the elytra brilliant green, and more or less oblong and parallel sided; length generally slightly over half-an-inch - - *P. dimidiatus*.

First two joints of antennæ entirely black, colour and shape of elytra as in *dimidiatus*. Length half-an-inch - - *P. lepidus*.

P. cupreus and *P. versicolor* seem to be common and generally distributed; I have taken both on dry heathy ground.

P. dimidiatus and *P. lepidus* are more local, the localities given by Mr. Dawson for the former being Hampstead Heath, Wandsworth Common, and Folkstone; whilst the latter species seems to occur chiefly in the fen counties.

GROUP C.

P. picimanus.—The only species of the genus of a reddish-brown colour. Its thorax is much narrowed behind, and the elytra are very flat and parallel sided. This insect reminds one somewhat of a small pitchy-red *Broscus*—its length being about half-an-inch. It is a rather local species, but the localities given by Mr. Dawson are widely separated.

P. niger is easily recognised by its *flat, dull, elytra*, which have deep striae. Next to *striola* this is the largest species of the genus, measuring about $\frac{3}{4}$ of an inch in length. Very abundant everywhere.

P. vulgaris (melanarius) is at first sight likely to be confounded with the previous species, but, in addition to its smaller size ($6\frac{1}{2}$ to 8 lines), it is more shining, and the elytra are narrower and more convex; the thorax has a more distinct basal depression, and its sides are more rounded. This species is also very abundant.

P. parumpunctatus.—This species, which is apparently very local, might easily be confounded with a specimen of *P. niger*, except that the sides of the thorax which are nearly straight in *niger* are in *parumpunctatus* distinctly narrowed behind. I know no locality for the species, which I have only once seen, viz., in the collection of Mr. Joseph Chappell, of Manchester.

P. anthracinus and *P. nigrita*.—These species bear a very close resemblance to the common *P. vulgaris* except that they are smaller (about $4\frac{1}{2}$ to 6 lines). In both the thorax is somewhat narrowed behind, but in *anthracinus* the posterior angles are right angles, the basal foveæ are larger, and the elytra longer with a little tooth at the extreme tip, next the suture, which is absent in *nigrita*, in which the posterior angles of the thorax are somewhat blunt. The males of both species may be easily distinguished, for whereas in *nigrita* the last segment of the abdomen has a small tubercle on the under-side, in *anthracinus* this tubercle is replaced by a large depression. *P. nigrita* seems to be common everywhere, and very variable in size. *P. anthracinus* is more scarce. Both species frequent marshy places.

P. gracilis is easily distinguished by its length, being slightly over $\frac{1}{4}$ inch (4 lines); the elytra are narrow and parallel sided; the thorax has a large deep depression on each side, the legs and the apex of the antennæ are more or less red. It does not seem very common, and is taken, like the two preceding species, in marshy places.

P. oblongo-punctatus.—This species is recognised by its distinct brassy tinge; by its broad elytra, which are only slightly convex, and have a row of four or five very distinct impressions in the third interstice. Length slightly under half-an-inch. Not very common, and apparently more confined to woods than others of the genus.

P. vitreus (orinomus).—This species, like the preceding, has a row of distinct impressions (4 or 5 in number) in the third interstice of each elytron, but it wants the brassy tinge of that species. The thorax also is broader than long, and the antennæ thick, whereas in *oblongo-punctatus* the antennæ are slender and the thorax is nearly square. Length about five lines. A mountain species, which I have taken at Llangollen and on Snowdon.

P. aterrimus.—This local species, which occurs principally in the fen districts, is easily distinguished from the remaining species with rounded posterior angles to the thorax, by its elytra, which are long, flat, shining, and parallel-sided. Length about half-an-inch.

P. madidus.—A very common species, recognised at once by its rounded thorax and by the oblong-ovate elytra (not parallel sided) with only a single impression in the third interstice. Length from half to three-quarters of an inch. The legs vary from entirely red to wholly black.

P. æthiops, which is generally regarded as a race of *P. madidus*, differs from that species in having the elytra much shorter (but still rounded at the sides), and the third interstice has three impressions. This species occurs, I believe, only in elevated situations, as upon the mountains of Wales and Scotland.

The small species of the genus are divisible into two groups according to the presence or absence of a short stria at the base of each elytron between the suture and the first ordinary stria. This abbreviated stria is present in all the large species of the genus and can be well seen in *striola*. It is known as the *scutellary* stria.

(a.)—Scutellary stria absent - - *P. vernalis* and *P. inæqualis*.

Of these two species *P. vernalis* is the larger, measuring three lines. The elytra are parallel-sided in both species; in both also the thorax has the posterior angles nearly or quite right angles. In *P. vernalis* the insect is furnished with wings and the legs are pitchy, whilst in *inæqualis* the legs are red and the insect is apterous. *P. vernalis* is very common in damp places; *P. inæqualis* is rather local, but occurs in similar situations.

(b.)—Scutellary stria present - - *P. minor*, *P. strenuus*, and *P. diligens*.

P. minor has the apical joint of the palpi *truncate at the apex*; the whole insect is more or less parallel-sided; the thorax has the posterior angles right angles, and a shallow basal depression on each side. Length three lines. A somewhat local species, occurring in damp places.

P. strenuus and *P. diligens* much resemble each other, and differ from *P. minor* in being slightly smaller and not so parallel-sided; in having the thorax with a distinct deep depression on each side at the base, and in the posterior angles being acute; the palpi have the last joint ovate, *not truncate at the apex*. *P. diligens*, which is rather smaller than *P. strenuus*, is distinguished from that species by having the striæ at the outer portion of the elytra as deep as those near the suture, and in having the under side of the thorax *not punctured*; whereas *strenuus* has the thorax punctured at the sides underneath, and has the outer striæ on the elytra very fine and indistinct, whilst those next the suture are very deep.

[For the use of those students of Coleoptera who use "Dawson's Geodephaga,"

I may point out that the descriptions of the two insects last given are the reverse of those described by him. Mr. Dawson's *erythropus* is the insect described above as the *strenuus* of Panzer, whereas Mr. Dawson's *strenuus* is described above as the *diligens* of Sturm.]

AMARA.

This genus—a very puzzling one to most beginners—contains about 26 British species, but several of these have occurred so rarely that only a very short notice of them will be required. The genus is very naturally divided into two groups which differ considerably in their habits, for, whereas the species of the first group, consisting of those which have the thorax narrowed behind the middle, are nocturnal in their habits and frequent herbage—from which they are often brushed by the sweeping net—the members of the second group, or, at least, of the commoner sub-group, commencing at *tibialis*, are all sun-loving insects, and are most frequently met with on dry sandy ground, or on pathways, and are immediately recognised by their shining bronze colours. In this group the thorax is never narrower behind than in the middle.

GROUP A.

Thorax narrower at the base than in the middle (*Bradytus*, Stephens).

a.—Colour of the upper side yellowish brown or reddish. Length about 4 lines - - *A. fulva*.

b.—Colour of the upper side pitchy black.

1. Length not over 4 lines - *A. apricaria* and *A. consularis*.

Apricaria is easily distinguished from *consularis* by its smaller size (3 to $3\frac{1}{2}$ lines), and by having the striæ on the elytra *not punctured at the apex*. *Consularis* has the striæ *deeply punctured throughout* and measures about 4 lines in length.

2. Length 5 to 6 lines - - *A. spinipes* and *A. convexiuscula*.

Spinipes is easily recognised by its having two deep punctures between the eyes, by having the thorax punctured in front, and by the elytra being more or less rounded at the sides, with deep striæ. *Convexiuscula* wants the punctuation on the front of the thorax, the depressions between the eyes are very shallow, the elytra are longer and parallel-sided, with finer striæ.

(*A. alpina*, which measures about $4\frac{1}{2}$ lines, is parallel-sided, but has the antennæ and tarsi pitchy, whereas in all the other species these are red. It is very scarce, only two specimens being recorded from the Scotch mountains).

Of the above species, *apricaria* is undoubtedly the most generally distributed. It may often be found in moss on walls and under stones during the winter. *A. spinipes* probably comes next in order of frequency, being common on herbage at night, and under stones in the day-time. The late Mr. Kinder used to take this species freely nearly Liverpool on thistle-flowers. *A. fulva* seems to be found most commonly in sandy places near the coast, but whether it is exclusively a coast insect I cannot say. *A. consularis* and *A. convexiuscula* are scarcer insects, and I know nothing of their habits.

GROUP B.

Thorax wider behind than in middle.

a.—Thorax not much narrowed in front; colour of upper side pitchy red or pitchy black.

1. Length over three lines - - *A. patricia* and *A. fusca*.

A. patricia measures four to five lines; is pitch-black above with deeply punctured striæ, and has the dilated joints of the male anterior tarsi very broad.

A. fusca is about 4 lines in length, brownish black above; the eyes are very prominent, the elytra have very finely punctured striæ, and the joints of the male tarsi are narrower.

Both species are very scarce.

2. Length 2 to 3 lines, anterior angles of the thorax *rounded* - -

A. infima and *A. bifrons*.

A. infima is very small (slightly over 2 lines), pitchy black in colour, convex, and has short antennæ. Scarce.

A. bifrons measures $2\frac{1}{2}$ to 3 lines, is reddish brown in colour, and has the antennæ longer. It is also not so convex as *infima*. Not common, but occurs in sandy places as on the sandhills on the Lancashire coast.

3. Length $2\frac{1}{4}$ to $3\frac{1}{2}$ lines; anterior angles of the thorax *pointed and prominent* - - *A. rufocincta* and *A. Quenselii*.

Both these rare species have the side margin of the thorax reddish; but *rufocincta* has the sides of the thorax rounded and the upper side pitchy, while *Quenselii* has the sides of the thorax scarcely rounded and is dark bronze in colour.

b.—Thorax distinctly narrower in front than behind; colours green, bronze, or brassy black.

1. Spine at the apex of the anterior tibiæ *simple* (with a single point).

I. Length under four lines.

Legs entirely red or reddish brown.

A. tibialis.—Easily recognised by the *two deep pits* on each side of the thorax. Length 2 lines.

A. lucida.—Length 2 to $2\frac{1}{2}$ lines. Blackish or greenish bronze; anterior angles of the thorax rounded and not prominent.

A. familiaris.—Length $2\frac{1}{2}$ to 3 lines. Greenish bronze or bronze; anterior angles of the thorax pointed and prominent.

Legs wholly or entirely black; first two joints of antennæ red.

A. spreta.—Length $3\frac{1}{2}$ lines. Striæ on the elytra not deeper behind than in front.

A. curta.—Length 3 lines. Striæ on elytra deeper behind; legs partly (tibiæ) reddish.

A. lunicollis.—Length $3\frac{1}{2}$ lines. Striæ deeper behind; legs wholly black.

Legs wholly or partly black; first THREE joints of antennæ red.

A. trivialis.—Striæ of elytra not deeper behind.

A. communis.—Striæ of elytra deeper behind; the row of punctures at the margin of the elytra is interrupted.

A. continua.—Striæ of elytra deeper behind; marginal row of punctures continuous.

bb.—Length 4 to 5 lines.

A. acuminata.—Legs entirely black; elytra somewhat produced at the apex; striæ not deeper behind.

A. ovata.—Legs entirely black; elytra rounded at the sides, simply narrowed, but not produced; striæ deeper behind than in front.

A. similata.—Legs with (generally) the tibiæ and tarsi red. Sometimes the legs are entirely black, but the species can then be easily distinguished from *ovata* by being narrower and not so flat as the latter. The posterior angles of the thorax are right angles, whereas in *ovata* they are acute.

2. Apical spine of the anterior tibiæ *with three points*.

A. strenua.—Length 4 lines. Striæ of the elytra distinctly punctured; base of the thorax with *one impression* at each side.

A. plebeia.—Length 3 lines. Striæ of the elytra nearly without punctures; thorax *two small impressions* at each side of the base.

Of the above species (from *tibialis*), *familiaris*, *trivialis*, *communis*, *similata*, and *plebeia* are common *everywhere*; *tibialis* occurs in sandy situations, as on coast sandhills; *lucida* occurs less commonly, but in similar situations; while *acuminata*, *spretæ*, *curta*, *lunicollis*, *ovata*, and *strenua* are fairly distributed, generally occurring singly or in pairs, and not in such abundance as such species as *communis* or *familiaris*. *Continua* which has been recently added to the British fauna, seems to have occurred in fair numbers to different collectors, by whom it has been mistaken for *communis*.

ZABRUS.

Z. gibbus.—This species, which is easily recognised from the description of *Zabrus* in the analytical table of genera, is common but somewhat local, occurring occasionally in great abundance on the unripe ears of corn on which it feeds by night. In length, it measures slightly over half-an-inch.

There yet remain to be described the species of the family *Trechidæ*, and of the genera *Patrobis* and *Pogonus*, which I have included in the second (B.) division of the Feronidæ, in the analytical table of genera, on pages 26 to 28, and which are there distinguished from the other Feronidæ (except the genera *Licinus* and *Panagæus*) by having only *two joints* of the male anterior tarsi dilated. Both the Pogonidæ (including *Patrobis*) and the Trechidæ are usually placed between the Harpalidæ and the Bembidiidæ, the species of the Trechidæ exhibiting a general resemblance to the "Bembids," and one genus, *Perileptus*, having the apical joint of the palpi somewhat needle-shaped, a peculiarity of structure almost peculiar, among the Carabidæ, to the Bembidiidæ.

PATROBUS.

The species of this genus, which are three in number, are easily recognised by their elongate form, by their mostly pitchy upper surfaces, red legs, and by the thorax being distinctly narrowed behind and possessing a deep pit or depression at each side of the base. The three species, *P. excavatus*, *P. assi-*

milis, and *P. septentrionis*, possess a great general resemblance, and are not easily distinguished except by comparison of specimens. The first two species are apterous, but *septentrionis* is furnished with wings, is more parallel-sided, and has a shorter thorax than either of the other species. *Assimilis* differs from *excavatus* in having the thorax more convex and more narrowed behind than in *excavatus*, which is more shining and altogether of a flatter appearance. All three species measure about a quarter-inch in length, and are generally, but not always, taken in mountainous districts, *excavatus* being the commonest and most widely distributed species. I have taken *assimilis* commonly on Snowdon and on the high moors near Llangollen.

POGONUS.

This genus also contains three British species, viz., *luridipennis*, *littoralis*, *chalceus*, all of which are moderately common on the muddy banks of rivers. The species are very easily distinguished as follows:—

A. *Head and thorax green; elytra yellow.*

Length $3\frac{1}{2}$ lines - - - - - *luridipennis*.

B. *Head, thorax, and elytra bronze.*

Elytra broad and rounded at the sides. Length $3\frac{1}{4}$ lines - *chalceus*.

Elytra narrow and parallel-sided. Length 3 lines - - *littoralis*.

TRECHIDÆ.

The British species of this family are distributed among three genera, *Trechus*, *Apus*, and *Perileptus*. These genera are easily distinguished as follows:—

A. *Length over 1 line* - - - - - *Trechus*.

B. *Length 1 line.*

Elytra without striæ - - - - - *Apus*.

Elytra with striæ (although these are faint at sides and apex) - - *Perileptus*.

TRECHUS.

This genus contains nine British species, several of which are rare. They are not easily distinguished from one another except by comparison side by side, but the following arrangement will, to a certain extent, be serviceable to a beginner:—

A. *Elytra oblong, with parallel sides.*

1. Elytra red, with a distinct bluish black spot across the hinder portion; length $2\frac{1}{2}$ lines - - - - - *discus*.

2. Elytra red, with a faint darker marking behind the middle; striæ near the suture very fine; length 2 lines - - - - - *micros*.

3. Elytra brownish without dark spots; striæ near the suture deep; length $1\frac{3}{4}$ lines - - - - - *longicornis*.

B. *Elytra ovate, with the sides more or less rounded.*

a. *Posterior angles of the thorax more or less distinct, even if obtuse.*

Length over 2 lines.

4. Thorax yellowish; elytra flat - - - - *lapidosus.*
 5. Thorax brown; elytra convex - - - - *rubens.*

Length not over 2 lines.

6. Elytra with the four striæ nearest the suture equally distinct; posterior angles of the thorax fairly distinct, and the sides not much rounded; length $1\frac{1}{2}$ lines - - - - *minutus.*
 7. Elytra with only the two striæ next the suture at all distinct; posterior angles of the thorax not so distinct, sides of thorax more rounded, and the elytra shorter; length $1\frac{1}{2}$ lines - - - - *obtusus.*
 8. Elytra with three deep furrows on each side of the suture; posterior angles of the thorax right angles; length 2 lines - - - - *rivularis.*
 b. *Posterior angles of the thorax completely rounded* - - - - *secalis.*

Of the above species, only one (*minutus*) is at all abundant, and this occurs everywhere under stones, at tree roots, &c. *Discus, rubens, obtusus,* and *secalis*, are fairly common, principally haunting the banks of streams, running off and hiding themselves with surprising agility when disturbed. The remainder of the species are more or less rare.

ÆPUS.

The two species of this genus have the curious habit of living under stones on the sea-shore at, or even (it is said) below low-water mark, where they are only uncovered during spring tides. They are both very minute, and the principal point of difference seems to be that *Æ. marinus* has the posterior angles of the thorax right angles, whilst *Æ. Robinii* has these angles slightly obtuse. Both species measure about one line in length, and are of a yellowish colour and very flat.

PERILEPTUS.

The single species of this genus, *P. areolatus*, is about one line in length; the head and thorax are pitchy black, and the elytra are reddish yellow with a darker side margin. Of its habits I know nothing. The species is given in Cox's Handbook as "not common."

HARPALIDÆ.

We have now to consider the characters of those genera the species of which have *four joints of the male anterior tarsi* (and generally also of the intermediate tarsi) *dilated*. The genera, though only six in number, are by no means easily tabulated; indeed, for the beginner, the only tabulation

which is likely to be of service is to divide the family into two groups according to size, and then to describe separately the genera which fall into each group.

A. *Length 4 lines or more.*—*Diachromus*, *Anisodactylus*, and *Harpalus* (part.)

B. *Length under 4 lines.*—*Dichirotrichus*, *Harpalus* (part), *Stenolophus*, and *Bradycellus*.

DIACHROMUS.

This genus contains a single British species, *D. Germanus*, which is very rare, it measures 4 lines in length, and has the head yellowish, the thorax green or blue, the elytra yellow with a blue-black spot on the hinder half, and the legs yellow.

ANISODACTYLUS.

This genus contains two British representatives, viz., *A. binotatus* and *pæciloides*, both of which measure slightly under half-an-inch. *A. binotatus* is black, with *two red spots between the eyes*—a character which distinguishes it from all other British Carabidæ. It occurs pretty commonly on muddy shores. *A. pæciloides* is green, with the posterior angles of the thorax rounded. It may be distinguished from any *Harpalus*, which genus it closely resembles in general appearance, by its greater breadth, and by having the dilated tarsal joints of the male *covered beneath with long hairs*. The apical spine of the anterior tibiæ also is three-pointed. This species is moderately common.

DICHIROTRICHUS.

The two species of this genus are easily distinguished from *Stenolophus* and *Bradycellus* by their size ($2\frac{1}{2}$ to $3\frac{1}{2}$ lines) and by the whole body being thickly punctured and hairy. Both species are of a pale yellow-ochre colour with a dark marking of an oblong form on each elytron, but the commoner species, *D. pubescens*, is *sometimes entirely pitchy brown*. In *D. obsoletus*, which is also the larger species, the striæ on the elytra are impunctate, although the interstices are thickly punctured; whereas in *D. pubescens* the interstices (and whole upper side) are not so deeply punctured, but the striæ are distinctly punctate. Both species are fairly common on sea-shores and in muddy places on the banks of rivers, &c. They may be distinguished from the genus *Harpalus*, which they much resemble, by the intermediate tarsi of the males *not* being dilated, while they are distinctly so in *Harpalus*.

HARPALUS.

This genus, the species of which differ so much among themselves, is easily distinguished from *Stenolophus* and *Bradycellus* by the greater size of

the species and by the legs being stout, whilst in these two genera they are slender. It may be distinguished from the other three genera of the family by the characters given above. The British species number about thirty. They vary considerably in size, but are generally easily recognised by their compact form and by the intermediate tarsi of the males being widely dilated—these joints not being furnished with the long hairs which form a sole to the feet of *Dichirotrichus*, *Anisodactylus*, and *Diachromus*. The arrangement I have followed is nearly that given in Cox's "Manual," being, I believe the simplest manner of separating the species. They are divisible at once into two groups, the first comprising those which have the upper side more or less thickly punctured and the elytra pubescent; the second containing those which are destitute of regular punctuation (except occasionally the outer interstices), and where pubescence is wanting.

GROUP I.—Interstices of the elytra punctured and hairy (head and thorax generally punctured.)

1. *Head, thorax, and elytra greenish or bluish* :—

Length $\frac{1}{2}$ inch; posterior angles of the thorax rounded; colour dull
- - - *obscurus*.

Length $\frac{1}{4}$ inch; posterior angles of the thorax rounded; colour bright
- - - *azureus*.

Length about 4 lines; posterior angles of the thorax right angles
- - - *punctatulus*.

2. *Head and thorax pitchy; elytra dull green* :—

Posterior angles of the thorax pointed; length $\frac{1}{2}$ inch - *sabulicola*.

Posterior angles of the thorax rounded; length $\frac{1}{2}$ inch; sides of
thorax much rounded - - - *rotundicollis*.

3. *Head, thorax, and elytra pitchy or black* :—

a. *Length under 5 lines*.

Thorax nearly square and with the sides much rounded in front - -
rupicola, puncticollis.

These species resemble one another very closely, and are with difficulty distinguishable from description. *Rupicola* is broader and longer and has a duller appearance than *puncticollis*, which has a more shiny appearance, and measures from 3 to $3\frac{1}{2}$ lines.

Thorax much wider than long with the sides rounded in front. Punctuation not so distinct as in the two previous species. Length
 $3\frac{1}{2}$ lines - - - *rufibarbis (rufilabris)*.

Thorax with the sides not rounded in front; length $2\frac{1}{2}$ to 3 lines
- - - *parallelus*.

b. Length over 5 lines.

Head and thorax not punctured; elytra with golden pubescence
- - *ruficornis*.

(*Scybalicus oblongiusculus*, a species recently introduced as British, resembles *H. ruficornis* in appearance, but has the posterior angles of the thorax rounded, whereas *ruficornis* has these angles right angles.)

GROUP II.—Upper side not punctured (except the base of the thorax and the outer interstices of the elytra occasionally).

a. Thorax broader in front than behind.

1. Outer interstices of elytra punctured; elytra deeply sinuate before the apex; colour bronze, green, blue, or black - - *proteus*.

2. Outer interstices not punctured; elytra not deeply sinuate behind.

Antennæ and legs black or pitchy; colour like *proteus* - *ignavus*.

Antennæ and legs red; colour more or less pitchy - - *consentaneus*.

All the above measure from $3\frac{1}{2}$ to 5 lines in length.

b. Thorax about as broad in front as behind.

Legs pitchy black; length $\frac{1}{2}$ inch - - : - *cupreus*.

Legs partly or wholly red.

1. *Legs entirely red.*

Upper side greenish; margins of thorax and elytra red; length $\frac{1}{2}$ inch
- - *discoideus*.

Upper side greenish or black; margins of thorax only often red -
rubripes.

Upper side black; third interstice of elytra without distinct impressions; side margin of the thorax red - - *latus*.

Upper side bluish black; third interstice of elytra with two or three deep impressions; thorax without a red margin - *quadrupunctatus*.

2. *Legs more or less pitchy.*

Length $3\frac{1}{2}$ lines; thorax with a deep longitudinal depression at the base; sides of thorax rounded - - *neglectus*.

Length 4 to 5 lines; thorax with the sides not rounded and without a deep depression at base - - *tenebrosus*.

c. Thorax narrower in front than behind.

1. *Antennæ and palpi entirely red.*

Flat; length under 4 lines; thorax with the base slightly emarginate
- - *servus*.

Convex; length $4\frac{1}{2}$ lines; base of thorax straight - - *tardus*.

2. *Antennæ and palpi more or less pitchy.*

Length under $3\frac{1}{2}$ lines - - - - *anxius*.

Length over $3\frac{1}{2}$ lines.

- a. Palpi red, with the base of each joint black, and the 2nd, 3rd, and 4th joints of the antennæ black.

Length $4\frac{1}{2}$ lines; flat; apex of elytra slightly produced - - -
melancholicus.

Length 5 lines; convex; apex of elytra not produced - *serripes.*

- b. Palpi brown; with the apex of each joint reddish; antennæ brown, except the first joint, which is red.

Length 5 lines - - - - - *caspicus.*

All the above species, from *neglectus*, have the upper surface black, sometimes with a bluish reflection.

One species is omitted from the above table, viz., *H. picipennis*, as it is easily distinguished from all the Harpalus of Group II. by its small size (2 to 3 lines).

The various species of the genus Harpalus are very similar in their habits and location. They generally inhabit dry, sandy situations, under stones, or clods of earth. *H. ruficornis* and *H. proteus* are abundant everywhere, the latter well deserving its specific name from its variability of aspect, but always recognisable by its deeply sinuate elytra, which have the outer interstices thickly but finely punctured. Other common species are *puncticollis*, *rufibarbis*, *latus*, *tardus*, and *anxius*, the latter, with us, being partial to dry sandy ground in the neighbourhood of the seashore. Those which are not so common are *rotundicollis*, *punctatulus*, *azureus*, *ignavus*, *consentaneus*, *rubripes* (which has a great resemblance at first sight to *proteus*, but from which it may be distinguished as above mentioned), *neglectus*, *serripes*, *caspicus*, and *picipennis*. *Sabulicola* is not common, *obscurus* is scarce, *cordatus*, *rupicola*, and *melancholicus* are uncommon, while *parallelus*, *tenebrosus*, *cupreus*, *discoideus*, *quadripunctatus*, and *servus* are decidedly rare, and may be considered "lucky finds."

STENOLOPHUS.

The species of this genus may be distinguished by their slender legs, by the intermediate tarsi of the males being dilated, and by the small size of most species (under 3 lines.)

A. Length over 2 lines:—

Thorax reddish; elytra reddish, with a distinct blue-black spot on the hinder half, through which passes the suture. Length 3 lines -
S. teutonus.

Thorax reddish; elytra red-yellow, passing gradually into brown behind. Length $2\frac{1}{2}$ lines - - - *S. skrimshiranus.*

Thorax black, with yellow margin; elytra with spot behind as in *S. teutonius*. Length $2\frac{1}{2}$ lines - - - *S. vespertinus*.

B. Length $1\frac{1}{2}$ to 2 lines:—

1. Thorax red, with or without a dark spot on the disk.

a. Posterior angles of the thorax sharp right angles; elytra long, reddish with a black spot. Length 2 lines - - *S. consputus*.

b. Posterior angles of the thorax blunt or rounded.

Thorax entirely yellow; elytra brown, darker behind. Length $1\frac{1}{2}$ lines - - - *S. flavicollis*.

Thorax reddish; elytra yellow, with a large blue-black spot. Length $1\frac{1}{2}$ to 2 lines - - - *S. elegans*.

Thorax red, with a black spot on the disk; elytra with a dark blotch on each side. Length $1\frac{1}{2}$ lines - - - *S. Gyllenhali*.

2. Thorax black or pitchy.

Elytra entirely brown or pitchy. Length $1\frac{3}{4}$ lines - *S. brunnipes*.

Elytra black, with a yellow suture and base. Length $1\frac{3}{4}$ lines - - *S. meridianus*.

C. Length $1\frac{1}{4}$ lines:—

Entirely pitch black, except the antennæ and legs - *S. exiguus*.

Most of the species of this genus are uncommon; *S. vespertinus* and *S. meridianus* are the species most frequently met with. *S. brunnipes* and *S. flavicollis* are both scarce; while the rest of the species occur occasionally.

BRADYCELLUS.

This genus resembles somewhat the preceding, but the elytra are more rounded at the sides; the intermediate tarsi of the males are not dilated; and the largest species measures only a little over 2 lines.

A.—Without a short stria near the scutellum. Elytra yellow brown, with a faint darker spot near the suture. Length 2 lines - - *B. placidus*.

B.—Short scutellary stria present.

1. Antennæ pitchy, with the basal joint red; elytra with fine pubescence. Length 2 lines - - - *B. cognatus*.

2. Antennæ yellowish or reddish; elytra not pubescent.

a. Upper side brownish yellow; posterior angles of the thorax sharp right angles. Length $2\frac{1}{2}$ lines - - *B. distinctus*.

Posterior angles of the thorax blunt; upper side pale yellow red. Length $2\frac{1}{2}$ lines - - - *B. verbasci*.

Posterior angles of the thorax completely rounded; upper side brown; elytra long. Length 2 lines - - - *B. harpalinus*.

Head and thorax red; elytra brown, and broader in proportion to their length than in *harpalinus*. Length $1\frac{1}{2}$ lines - *B. collaris*.

b. Upper side pitchy; the suture and side margin pale. Length $1\frac{1}{2}$ lines - - - - - *B. similis*,

Of the species of the genus, several are common and widely distributed, such as *B. verbasci*, *B. harpalinus*, and *B. similis*. *B. placidus*, *B. cognatus*, and *B. distinctus* are fairly common, while *B. collaris* is very scarce.

B. harpalinus and *B. similis* seem partial to hilly ground, and the latter we take plentifully in September and October among dead leaves of heather. *B. distinctus* I have only taken once, but then it was plentiful in a swamp among rushes.

FAMILY BEMDIDIIDÆ.

The family BEMDIDIIDÆ is distinguished from all the other British Geodephaga by having the last joint of the palpi sharp and needle-shaped, while the last but one is thickened. The British species, comprised in five genera, *Limnæum*, *Cillenum*, *Tachys*, *Bembidium*, and *Tachypus*, are all of small size, usually from $1\frac{1}{2}$ to $2\frac{1}{2}$ lines in length, and with the exception of the genus *Bembidium*, the genera do not contain many species.

One of these genera (*Tachypus*) is distinguished by the two species possessing great general resemblance to a small *Elaphrus*, having very prominent eyes, and the elytra have patches of pubescence which give them a variegated appearance.

The two genera *Limnæum* and *Tachys* are distinguished by having no scutellary stria; the species of the genus *Tachys* are very small (1 to $1\frac{1}{4}$ lines), while the single species of the genus *Limnæum* measures 2 lines in length.

Of the two remaining genera the single species of *Cillenum* is distinguished from all the species of the genus *Bembidium* by the elytra being yellowish brown in colour, much elongate, and with the sides perfectly parallel.

LIMNÆUM.

L. nigropiceum, not a very common species, is pitchy in colour; the antennæ, palpi and legs are dirty red; the elytra are nearly square, and have the striæ near the suture very deep. Length 2 lines.

CILLENUM.

C. laterale.—Head and thorax bronze-green, the thorax much narrowed behind, with the posterior angles sharp. Length 2 lines. This species, which seems to be not very widely distributed, occurs in the Liverpool district in clayey places on the shore, near the mouth of fresh-water streams.

Its colour so resembles the tenacious clay among which it is found that it is with difficulty recognised. It is, I believe, confined to the sea coast.

TACHYS.

Upper side reddish yellow; thorax with sharp posterior angles. Elytra with four distinct striæ. Length $1\frac{1}{4}$ lines - - - *T. Focki*.

Upper side pitchy; thorax without sharp posterior angles. Elytra with two distinct striæ. Length $\frac{3}{4}$ of a line - - - *T. bistriatus*.

Head and thorax pitchy; elytra light yellow, with a dark spot at the scutellum, and another on the suture near the apex; thorax without sharp posterior angles - - - *T. scutellaris*.

T. Focki is scarce; the other species are rather local. I have never met with any of the species.

TACHYPUS.

T. pallipes. Eyes only slightly prominent; general colour coppery or greenish; first joint of the antennæ greenish. Length $2\frac{1}{2}$ lines.

T. flavipes. Eyes very prominent, extending beyond the sides of the thorax; colour as *T. pallipes*; first joint of antennæ yellow. Length 2 lines.

Both species are fairly distributed in damp places, although the smaller species *T. flavipes*, is perhaps the one which occurs the most abundantly.

BEMBIDIUM.

The insects comprised in this genus are very numerous, and many of the species are so nearly allied, that their identification is frequently a matter of difficulty. The British species included by recent authors in the genus *Bembidium* vary very much among themselves, and were distributed by former students of Coleoptera in several genera, viz.: *Philothus*, *Ocys*, *Peryphus*, *Notaphus*, *Lopha*, and *Tachypus*, while the genus *Bembidium* was restricted to *B. paludosum* and the two species now included in *Tachypus*. This last named species, *B. paludosum*, is markedly separated from all the other members of the genus by its very prominent eyes, and its general resemblance to a large Tachypus, or a small Elaphrus; its colour is coppery or greenish bronze, and it measures about $2\frac{1}{2}$ lines in length, being one of the largest members of the genus. It does not seem to be anywhere very common, and is generally among the desiderata of collectors. Omitting this species from further consideration we may divide the remaining members of the genus into two principal groups, according to the shape of the thorax.

In group I. the thorax is transverse (broader from side to side than from before backwards), not narrowed behind, although four species have the base slightly scalloped out at the sides and prominent in the middle, but in these the posterior angles are blunt.

In group II. the sides of the thorax are distinctly narrowed behind, and the posterior angles are sharp right angles.

GROUP I.

a. Base of thorax straight.

B. rufescens. Head and thorax red; elytra dark brown with a bluish reflection. Length $2\frac{1}{2}$ lines.

B. quinquestriatum. Whole of the upper side dark green. Antennæ yellow. Length 2 lines.

B. obtusum. Whole of the upper side blackish green. Length $1\frac{1}{4}$ lines. Of these species *rufescens* is tolerably common, generally being found in moss on old walls during autumn, winter, and spring; *quinquestriatum* occurs in similar situations but is scarce; *obtusum* is perhaps the commonest of the three species, occurring in a variety of situations.

b. Thorax with the base rather prominent in the middle and more or less strongly scalloped out at the sides.

Two of these species have a distinct round red spot just before the apex of each elytron, the apex being also sometimes red. These are

B. biguttatum. Length 2 lines. Colour black with a greenish reflection. Sides of the elytra nearly parallel.

B. guttula. Length $1\frac{1}{2}$ lines. Colour black. Sides of the elytra more rounded.

The two remaining species of this sub-division are destitute of any distinct round red spot before the apex, though the apex itself is frequently reddish.

B. æneum. Length 2 lines. Bronze-black with the legs dark brown.

B. Mannerheimii. Length $1\frac{1}{2}$ lines. Brown-black with the legs yellow. All the four species occur on the banks of rivers, but all are more or less local, being abundant when they are once found.

GROUP II.

a. Striæ as distinct at the sides and apex as near the suture of elytra.

1. *Striæ on the elytra not punctured.*

B. prasinum. Bronze-green ; very flat. Length $2\frac{1}{4}$ lines.

2. *Striæ deeply punctured throughout.*

B. punctulatum. Bronze-green ; length $2\frac{1}{4}$ lines.

3. *Striæ punctured on the basal half.*

B. ephippium. Elytra yellow with a dark blotch behind ; antennæ and legs yellow. Length $1\frac{1}{2}$ lines.

B. obliquum. Elytra bronze with two narrow toothed transverse yellow bands, and sometimes one or two small yellow spots near the base. Antennæ black with the first joint red underneath ; legs black. Length 2 lines.

B. adustum. Elytra bronze with broad, transverse toothed yellow bands (so that the elytra sometimes appear to be yellow with bronze bands). Antennæ brown with the five basal joints reddish ; legs yellow. Length $2\frac{1}{4}$ lines.

B. varium. Elytra bronze with indistinct yellow bands ; seventh stria not reaching the apex. Antennæ brown with the four basal joints reddish. Length $2\frac{1}{4}$ lines.

B. flammulatum. Elytra bronze with distinct toothed yellow bands ; seventh stria reaching apex. Antennæ as in *B. varium*. Length $2\frac{1}{2}$ lines.

Of the above species *adustum* and *obliquum* are decidedly scarce ; the remaining species are common but local, frequenting generally damp places on river banks, among shingle, &c.

b. *Striæ becoming fainter at the sides and apex of elytra.*

1. *Elytra entirely black. Length about $1\frac{1}{4}$ lines.*

B. minimum. Antennæ entirely dark.

B. Schuppelii and *B. gilvipes* have the two basal joints of the antennæ red. *gilvipes* is longer in proportion to its width, and has the thorax more narrowed behind than *Schuppelii*. The legs of *gilvipes* are yellowish white. *Schuppelii* has dark femora.

Minimum is tolerably common on the banks of tidal rivers ; *gilvipes* is local ; *Schuppelii* is rare.

2. *Elytra black (or dark green and $1\frac{1}{2}$ lines in length), with a round red spot near the apex of each.*

B. Sturmii has the elytra black with several small yellow spots on the front half. Length $1\frac{1}{4}$ lines.

B. doris. Black ; furrows between the eyes converging towards the mouth. Length $1\frac{1}{2}$ lines.

B. assimile. Upper side dark green; thorax *much* narrowed behind. Length $1\frac{1}{2}$ lines.

B. Clarkii. Upper side dark green; thorax *not much* narrowed behind.

None of these species are at all common.

3. *Elytra shining black with two whitish spots on each.*

B. quadriguttatum. Length 2 lines. Antennæ dark, with the first and part of the three following joints yellow; legs yellow with brown knees, striæ on the elytra not punctured to the middle.

B. quadrimaculatum. Length $1\frac{1}{2}$ lines. Four basal joints of the antennæ yellow; legs yellow; striæ on the elytra punctured to beyond the middle.

B. quadripustulatum. Length $1\frac{2}{3}$ lines. Antennæ entirely dark; legs with femora black.

The two former of these species are tolerably common, especially in clayey cliffs, where they inhabit the cracks in the clay. *B. quadripustulatum* is very scarce.

4. *Elytra yellow with darker bands.*

B. articulatum. Length $1\frac{1}{2}$ lines. Head and thorax green. Elytra with two brown bands behind the middle.

B. pallidipenne. Length $2\frac{1}{4}$ lines. Head and thorax green or bronze; elytra with a dark patch at the scutellum, and one dark toothed band behind the middle.

B. fumigatum. Length $1\frac{2}{3}$ lines. Head and thorax dull bronze. Elytra with three irregular dark bands.

B. articulatum is tolerably common; *B. fumigatum* more local; *B. pallidipenne* is very local occurring only, I believe, on sandy sea shores.

5. *Elytra bronze.*

B. bipunctatum. Length 2 lines. Eyes prominent; each elytron with two deep depressions.

B. lampros. Length $1\frac{1}{2}$ lines. Antennæ black, with the two basal joints more or less red. Each elytron bears six striæ, while in the variety *velox* (or *B. 14-striatum*, Thoms.), there are seven striæ on each, and the thorax is wider and more convex than in the true *lampros*.

B. nigricorne. Length $1\frac{1}{2}$ lines. Antennæ entirely black; the thorax is much larger, and wider at the base than in *lampros*.

B. lampros occurs in plenty everywhere; *bipunctatum* is more local; and *nigricorne* is somewhat scarce occurring in heathy places.

6. *Elytra entirely green or blue green. Legs entirely yellow.*

B. stomoides differs from all the following in having the antennæ entirely yellow-red.

B. decorum, *monticola*, and *Stephensi*.

All these species measure from $2\frac{1}{2}$ to $2\frac{3}{4}$ lines in length. *Stephensi* is at once recognised by a distinct red blotch before the apex of each elytron; while *decorum* is immediately differentiated from *monticola* by its larger size and by the sides of the elytra being nearly straight (parallel), those of *monticola* being distinctly rounded.

Legs yellow with darker femora.

B. brunnipes. Thorax much shorter than in others of division 6. Length $2\frac{1}{2}$ lines.

Legs brown, yellow, or pitchy.

B. tibiale. Length $2\frac{1}{2}$ lines.

B. atrocæruleum. Length 2 lines.

Both these species are dark blue-green above. In the former the thorax is not much narrowed behind and the elytra are rounded at the sides; in the latter the elytra are nearly parallel-sided, and the thorax is distinctly narrowed behind. Of these green "bembids," which are somewhat difficult to identify by a beginner, *brunnipes* is decidedly the commonest; *monticola*, *tibiale*, and *atrocæruleum* are tolerably common among the shingle on the banks of rivers; *decorum* and *Stephensi* are more local, and *stomoides* is scarce.

7. *Elytra green with yellow markings.*

B. lunatum, the largest species of the genus, measures about 3 lines in length, and is dark green with a curved crescent-shaped yellowish mark before the apex of each elytron, without any markings towards the base.

B. testaceum. Elytra green with very large yellow spots at shoulders and apex, so large that the elytra appear to be yellow with a green suture, and a transverse band in the middle of the same colour. First three joints of the antennæ pale. Length $2\frac{1}{4}$ lines.

B. saxatile. Elytra green, with a yellow spot at the base and a small round yellow spot before the apex; antennæ with three basal joints pale; legs red. Length 2 lines.

All the following species are green, and the markings consist of a shoulder-spot, and one near the apex which is not small and round.

B. anglicanum. Length $2\frac{1}{4}$ lines. Antennæ with the first three joints pale; legs entirely yellow.

B. femoratum. Length 2 lines. The spots whitish yellow. Antennæ with first two joints pale; legs pale with dark femora.

B. Bruxellense. Length $2\frac{1}{4}$ lines. The spots dark yellow. Legs yellow with brown femora. Elytra strongly striate.

B. littorale. Length $2\frac{1}{2}$ lines. Legs and first three joints of the antennæ yellow, thorax not so long as broad.

B. fluviatile. Length $2\frac{3}{4}$ lines. Legs and first three joints of the antennæ yellow. Thorax longer than broad, and much narrower behind than in *littorale*, which it otherwise much resembles.

B. concinnum. Length $2\frac{1}{2}$ lines. Distinguished by the antennæ being entirely yellow, and the fact that the basal spot is joined to the apical one by the yellow outer margin of the elytra.

The most abundant of these species, indeed the commonest of the whole genus, is *B. littorale*, which occurs everywhere. *B. fluviatile* is scarce; *B. testaceum*, *B. saxatile*, and *B. Bruxellense* are more or less scarce; *B. femoratum* and the beautiful *B. concinnum* are tolerably common; *B. anglicanum* is very rare; and *B. lunatum* is local, though common where it does occur. Like most of the genus they frequent wet places, as the banks of rivers, especially where these banks are flat and shingly.

SCARITIDES.

There remain yet to be described the British insects included in the Scaritides, which number about eleven species. These are divided into two genera, viz., *Dyschirius* and *Clivina*, which are easily distinguished from each other by the size of their respective species, for while none of the *Dyschirii* measure more than 2 lines the two *Clivina* are usually 3 lines in length. Another useful point of distinction lies in the fact of the species of *Clivina* having the front margin of the head perfectly plain, while in *Dyschirius* this margin has a tooth at each end sometimes one in the middle in addition.

CLIVINA.

- | | | | | | |
|----------------------------|---|---|---|---|-----------------|
| 1. Colour dark brown-black | - | - | - | - | <i>fossor</i> |
| 2. Colour reddish brown | - | - | - | - | <i>collaris</i> |

Collaris is also usually rather smaller than *fossor*. The latter species is usually common while *collaris* is more local than its congener.

DYSCHIRIUS.

A. Length $1\frac{1}{4}$ to 2 lines.

a. Anterior tibiæ with two distinct teeth on the outer side.

1. *Length about 2 lines.*

Clypeus with three teeth (one in the middle and one at each end); colour usually shining bronze - - - - - *thoracicus*

Clypeus with two teeth (central one absent); colour dull dark bronze - - - - - *salinus*

2. *Length 1½ lines.*

Striæ on the elytra punctured to the apex; elytra very long and narrow - - - - - *angustatus*

Striæ on the elytra punctured to about the middle; elytra somewhat ovate - - - - - *aneus*

b. Anterior tibiæ without teeth (or if present they are very slightly marked on the outer side.

1. *Striæ on the elytra distinctly punctured.*

Punctures extending to the apex of the elytra. Length $1\frac{3}{4}$ lines - *extensus*

Punctures ceasing before the apex; elytra long, the striæ fine but equally deep throughout. Length 2 lines - - - - - *politus*

Punctures ceasing before the apex; elytra broader and nearly ovate; the outer striæ much fainter than those near the suture which are deep. Length 2 lines - - - - - *nitidus*

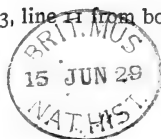
2. *Striæ on elytra not (or scarcely) punctured.*

Striæ deep and without, or with only the slightest traces of punctures. Length 2 lines - - - - - *impunctipennis*

B. Length about 1 line.

Differs from all the other species (which are bronze or greenish black) by being quite black - - - - - *globosus*

These species all frequent sandy places, especially sea-shores, where they prey upon minute Brachelytra; and they can be frequently found by the tracks of the burrows they (or perhaps rather their prey) make in the sand. Most of the species are local, the commonest being probably *thoracicus*, *salinus*, and *globosus*.



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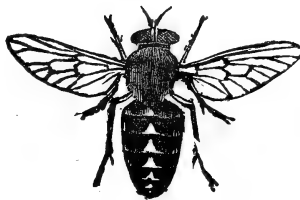
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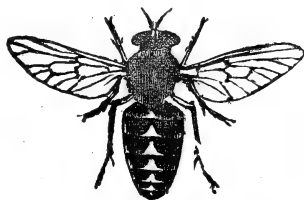
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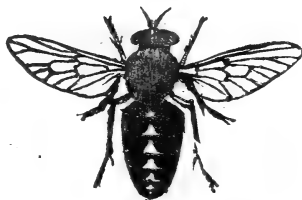
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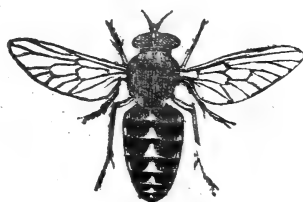
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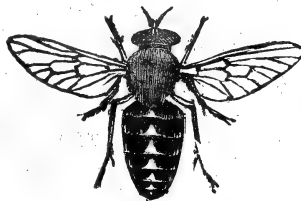
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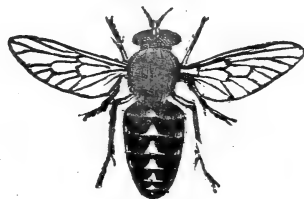
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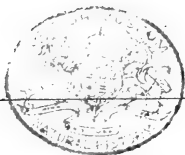
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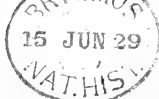
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